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The Chaetognath Fauna of the Waters of Western Japan

By

Takasi Tokioka

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(With 3 Charts and 4 Tables)

We have thus far only fragmental knowledge of the chaetognath fauna of the waters of western Japan, through the works by Moltschanoff (1907), Galzow (1909) and Yamada (1933). Moltschanoff describes *Sag. coreana* and *Sag. orientalis* from Tschemulpo; Galzow reports *Sag. levis* and *Sag. longicauda* from Uladiwostok, and *Sag. japonica* and *Sag. glacialis* from the Japan Sea; Yamada records *Sag. bipunctata* from the Yellow Sea, *Sag.* sp. from the Japan Sea and *Sag. serratodentata* from the sea off west Kyûsyû. Unfortunately, most of these descriptions are rather inadequate and there is much suspicion that the specimens have not been identified properly.

Recently rich chaetognath material was obtained from about 100 stations (Chart 1) in the waters of western Japan by the Husan Fishery Experiment Station in its surveying expeditions for the investigations on fish larvae in this district during the years 1936–38. The material comprises 18 species. The small-sized species such as *Sag. minima, Sag. regularis* and *Sag. neglecta* are very meagre. This is undoubtedly due to that the collecting nets were of rather large meshes.

The waters around Tyôsen may be divided into three divisions, each having distinctive features: 1) the western—the Yellow Sea division, 2) the southeastern division, or the region influenced by the Black Current (Kuro Sio), and 3) the northeastern division, or the region influenced by the Liman Current. It is of interest to know what kind of influence the chaetognaths distributed in these divisions get from the special conditions of the seas they inhabit. In the following lines are given systematic descriptions of the specimens discriminated in this material together with some faunistic notes. My hearty thanks are due to Prof. T. Komai for his kind guidance given through-

out this study and to Dr. KEITARÔ UCHIDA of the Husan Fishery Experiment Station for his courtesy in submitting the present material to my examination.

I. Systematic

1) *Sagitta hexaptera* d'ORBIGNY

Sagitta hexaptera, AIDA, 1897; FOWLER, 1906; MOLTSCHANOFF, 1907; MICHAEL, 1919; FRASER, 1937; TOKIOKA, 1939 a.

Locality: off west Kyûsyû. Stations 81–83, 91, 93, 101, 102. 13 individuals.

2) *Sagitta lyra* KROHN

Sagitta lyra, AIDA, 1897; TOKIOKA, 1939 a.
Sagitta furcata, FOWLER, 1906.

Locality: off west Kyûsyû. Station 81. 2 individuals.

3) *Sagitta enflata* GRASSI

Sagitta enflata, BÉRANECK, 1895–6; AIDA, 1897; FOWLER, 1906; MICHAEL, 1919; TOKIOKA, 1939 a.
Sagitta brachicephala, MOLTSCHANOFF, 1907.

The commonest species next to *Sag. bedoti*, specially abundant in surface layer, represented in nearly all the hauls from the stations off western Kyûsyû and southeastern Tyôsen. The present species is more common than *Sag. bedoti* in the oceanic waters influenced by the Black Current. In the regions where the warm oceanic and cold or brackish waters mingle, it disappears more readily than the latter.

4) *Sagitta bipunctata* QUOY et GAIMARD

(non YAMADA 1933)
Sagitta bipunctata, TOKIOKA, 1939 a.

A common visitor in the oceanic waters, though not abundant.

Locality: off southeast Tyôsen and off western Kyûsyû. Stations 36, 37, 39, 45, 82, 83, 86, 89–94, 97–102. 66 individuals.

5) *Sagitta bedoti* BÉRANECK

Sagitta bedoti, BÉRANECK, 1895–6; FOWLER, 1906; MICHAEL, 1919; TOKIOKA, 1939 a.
Sagitta bipunctata, AIDA, 1897; YAMADA, 1933 part.

The commonest species in the waters off southeastern Tyôsen and off western Kyûsyû. The northernmost limit in the Japan Sea is

station 16, and in the Yellow Sea it is station 76. It is to be noted that most of the individuals fished in the Yellow Sea mingled with *Sag. crassa* are of great size (see Formulae) and they were fished mostly from the deeper layer (st. 45–47, 61, 63) in the waters off western and southern Tyôsen.

Body length in mm.	Length of tail segment in %	Hooks	Anterior teeth	Posterior teeth
25 –26.9	24.8–26.4	6–7	10–13	24–24
27 –27.2	25.9–26.1	6–7	11–12	21–22
27.3–27.4	25.2–26	7–7	10–12	24–24
27.6–28.1	24.2–25.4	6–7	12–12	22–25
28.5–29.8	23.8–24.2	6–7	12–13	23–24

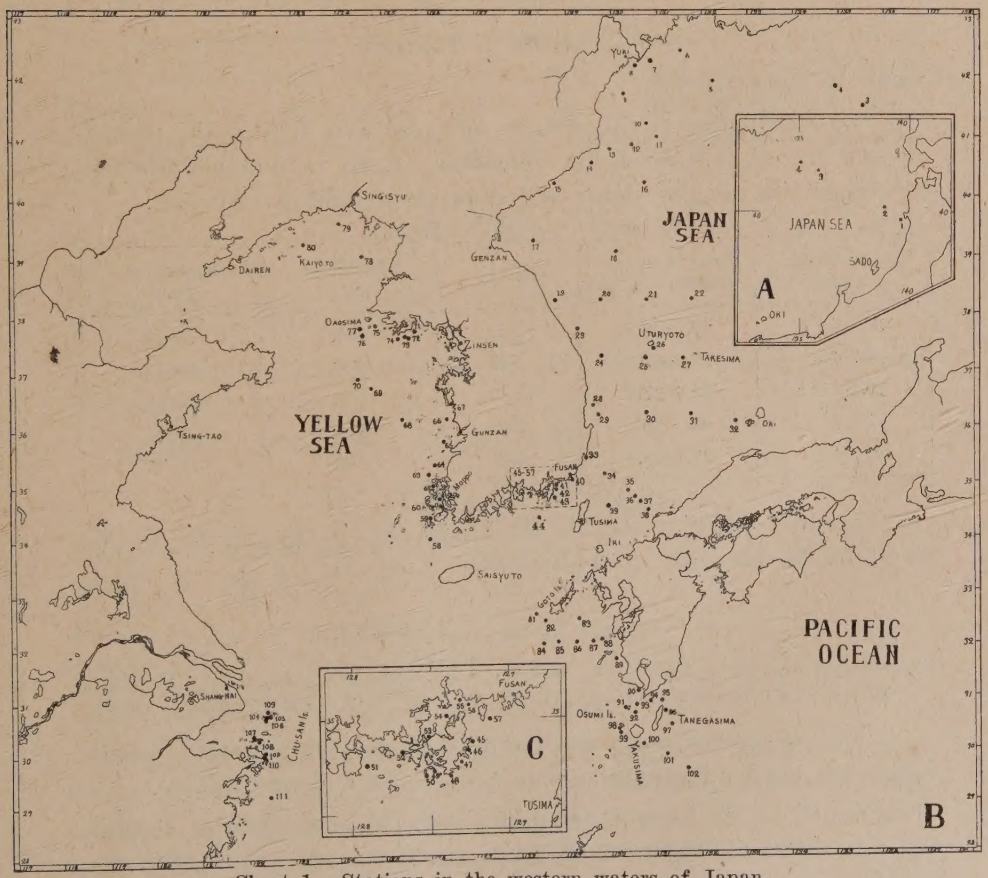

Chart 1. Stations in the western waters of Japan.

6) *Sagitta pulchra* Doncaster

Sagitta pulchra, Fowler, 1906; Michael, 1919; Tokioka, 1939 a.
Sagitta weberi, Oye, 1918.

Locality: Stations 46, 94, 95. 4 individuals.

7) *Sagitta robusta* Doncaster

Sagitta hispida, Aida, 1897.
Sagitta robusta, Fowler, 1906; Tokioka, 1939 a.
Sagitta japonica, Galzow, 1909.

Common, though rather small in quantity in the warm oceanic waters, like *Sag. bipunctata*.

Locality: Stations 16, 18, 22–27, 30–32, 34, 36–38, 83, 85, 86, 90–92, 94–100, 102. 291 individuals.

8) *Sagitta ai* Tokioka

Sagitta ai, Tokioka, 1939 a.

The distribution of this species coincides with that of the preceding one, though it is much less numerous. Some individuals fished in the Japan Sea are very large and show the following formulae:

Body length in mm.	Length of tail segment in %	Hooks	Anterior teeth	Posterior teeth
17.1–17.7	27.7–28.7	5–6	8–9	12–13
18.7–19	26.3–27.3	5–6	7–9	13–13
19.2–19.5	26.6–27.2	5–6	9–9	13–13
20 (2)	28 –29	5–6	8–9	14–14
20.3–21	27.1–28.6	5–6	8–8	12–15

Locality: Stations 21, 24, 26, 33, 34, 36, 37, 45, 46, 81, 83, 86, 89–91, 94, 95–100, 102. 73 individuals.

9) *Sagitta serratodentata* Krohn

Sagitta serratodentata, Béraneck, 1895–6; Aida, 1897; Fowler, 1906; Michael, 1919; Yamada, 1933; Russell, 1935; Fraser, 1937, 1939; Tokioka, 1939 a.

This is a common species in the pure warm oceanic waters, though it is much smaller in quantity than *Sag. bedoti* and *Sag. enflata*.

Locality: off western Kyûsyû and off southeastern Tyôsen. Stations 33, 39, 81–82, 84–86, 88–90, 93, 94, 98, 99, 101. 90 individuals.

10) *Sagitta neglecta* Aida

?*Sagitta bipunctata*, Béraneck, 1895–6.
Sagitta neglecta, Aida, 1897; Fowler, 1906; Michael, 1919; Tokioka, 1939 a.
?*Sagitta trichodermis*, Oye, 1918.

Locality: Station 29. 2 individuals.

11) *Sagitta regularis* Aida

Sagitta regularis, Aida, 1897; Fowler, 1906; Tokioka, 1939 a.
?*Sagitta pseudoregularis*, Oye, 1918.

Locality: Stations 27, 30, 87, 94. 5 individuals.

12) *Sagitta minima* Grassi

Sagitta minima, Aida, 1897; Michael, 1919; Tokioka, 1939 a.

Locality: Stations 81, 82. 8 individuals.

Sag. neglecta, *Sag. regularis* and *Sag. minima* are common species in the oceanic waters, and occur abundantly in the waters off western Kyûsyû and off southeastern Tyôsen. In the present material, however, they are very few, owing to that the nets used were of large meshes.

13) *Sagitta decipiens* Fowler

Sagitta sibogae, Fowler, 1906.
Sagitta decipiens+*Sagitta philippini*, Michael, 1919.
Sagitta decipiens, Tokioka, 1939 a.

A mesoplanktonic species of the warm oceanic waters; very rare in the surface waters.

Locality: Station 81. 4 individuals.

14) *Sagitta crassa* Tokioka

?*Sagitta coreana*, Moltschanoff, 1907.
?*Sagitta orientalis*, Moltschanoff, 1907.
?*Sagitta levis*, Galzow, 1909.
?*Sagitta longicauda*, Galzow, 1909.
Sagitta bipunctata, Yamada, 1933 part.
Sagitta crassa, Tokioka, 1938.
Sagitta crassa forma *naikaiensis*, Tokioka, 1939 b.

The commonest species in the coastal waters of western Tyôsen where the salinity of the water is low. These Yellow Sea individuals are large in size, measuring 21 mm in body length (see Formulae) and are exactly the same in appearance as those found in Ise Bay.

Body length in mm.	Length of tail segment in %	Hooks	Anterior teeth	Posterior teeth
15.2–15.5	29.6–29.7	9–10	10–10	22–27
16.7–17.1	29.3–32.7	9–9	12–13	28–29
18 –18.5	30.6–31.9	10–11	12–14	30–36
19.5–20	30.3–30.5	8–10	13–14	30–35
21 (2)	26.7–29	10–11	11–12	32–33
21.3–21.8	28.2–29.8	9–10	11–16	29–43

Sag. bipunctata of YAMADA seems to include both *Sag. bedoti* and *Sag. crassa*. It is not impossible that *Sag. orientalis* MOLTSCHANOFF which measures 18.5 mm in body length is identical with the present species; also *Sag. coreana* MOLTSCHANOFF, 9–10 mm in body length, may be referred to a smaller form like *forma naikaiensis* of this species. These forms occupy the greater part of *Sag. crassa* fished from off eastern Tyôsen. In the coastal waters of southern Tyôsen, individuals of the typical form and of *forma naikaiensis* are mingled in various proportions. In the Japan Sea, the northern limit for this species is found at station 14, where it is represented by *forma naikaiensis*. The problematical species, *Sag. levis* and *Sag. longicauda* recorded by GALZOW from Uladiwostok also seem to represent distinct forms of *Sag. crassa*.

The distribution of *Sag. crassa* seems to be limited in bays or inlets of low salinity. It occurs commonly in Ômura Bay and Ariake Bay in Kyûsyû, the Inland Sea, Ise Bay, Tôkyô Bay and Aomori Bay in Honsyû. It is not found in open oceanic waters of high salinity. *Sag. crassa* of the waters off eastern Tyôsen apparently has its origin either in the Yellow Sea or in the coastal waters of southern Tyôsen where the salinity is low; it is then transported by the Tusima Current and its branch to the eastern coast of Tyôsen. Besides, there may be some individuals originated in bays along the eastern coast of Tyôsen such as Eikô Bay near Genzan. Individuals obtained from St. 82 and 92 may be considered to be originally from Ômura-, Ariake- or Kagosima Bay.

As mentioned in my previous paper (1939 b), this species shows a wide range of variation in the body length of mature individuals and in the appearance of collarette, though the proportional length of tail segment, the formula of armature, the type of corona ciliata, the shape and situation of seminal vesicle and the length of ovary are

all limited. The factors causing those variations are not yet fully studied. Only two specimens in the present collection have long ovaries reaching from the ventral ganglion to neck as in *Sag. bombayensis*; the corona ciliata begins behind the eyes unlike in the latter species. Many individuals from the Yellow Sea are infected by parasitic nematodes.

15) *Sagitta elegans* Verrill

Sagitta elegans+*Sagitta glacialis*, Galzow, 1909.
?*Sagitta flaccida*, Galzow, 1909.
Sagitta elegans elegans, Fraser, 1937, 1939.
Sagitta sp., Yamada, 1933.
Sagitta elegans, Russell, 1935, 1936; Tokioka, 1939 a.

Common in the cold waters off northeast Tyôsen, influenced by the Liman Current. The southernmost limit of this species in the present colleciton is station 24. *Sag. gracialis* Moltschanoff reported from the Japan Sea by Galzow seems to be a young individual of *Sag. elegans* with which Yamada's *Sag.* sp. is quite identical.

16) *Pterosagitta draco* (Krohn)

Spadella draco+*Spadella vougai*, Béraneck, 1895–6.
Spadella draco, Aida, 1897; Fowler, 1906.
Pterosagitta draco, Michael, 1919; Tokioka, 1939 a.

An inhabitant of the warm oceanic waters. Common, but not abundant.

Locality: Stations 81–83, 89, 90, 93, 99 a, 100, 102. 17 individuals.

17) *Krohnitta pacifica* (Aida)

Krohnia pacifica, Aida, 1897; Fowler, 1906.
Krohnitta kerberti, Oye, 1918.
Krohnitta pacifica, Tokioka, 1939 a.

An inhabitant in the surface layer of the warm oceanic waters.

Locality: Stations 34, 37, 91, 95, 97, 98. 15 individuals.

18) *Krohnitta subtilis* (Grassi)

Krohnia subtilis, Fowler, 1906.
Krohnitta subtilis, Michael, 1919; Tokioka, 1939 a.

A rare species; fished chiefly from the oceanic waters as a mesoplankton.

Locality: Stations 83, 93. 2 individuals.

II. Faunistic

(Charts 2–3)

a) *The waters off western Kyûsyû.* The waters in this area are quite oceanic and of high salinity and temperature, being influenced by the Kuro-Sio (stations 90–102) or by the Tusima Current (stations 81–89). *Sag. enflata* and *Sag. bedoti* are the commonest and most abundant inhabitants. They occur also near Chusan Islands in the Eastern Sea. *Sag. robusta, Sag. ai, Sag. bipunctata* and *Sag. serrato-dentata* are also common species. *Sag. regularis* and *Sag. minima* are fewer, while *Sag. neglecta* is not represented. *Sag. hexaptera, Sag.*

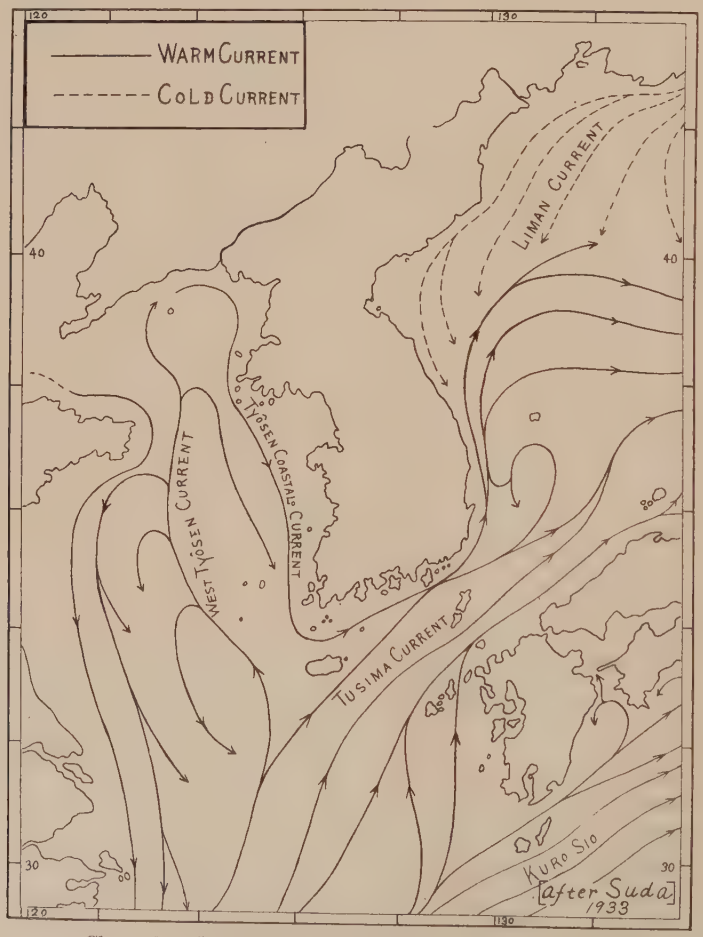

Chart 2. Currents in the western waters of Japan.

Chart 3. Distribution of four important chaetognaths in western waters of Japan. ●*Sag. bedoti* & *Sag. enflata* (warm oceanic-water forms) ▲*Sag. elegans* (cold-water form) ■ *Sag. crassa* (inlet or brackish water form).

lyra, Kr. pacifica and *Pterosag. draco* are all meageraly represented, while *Sag. pulchra, Sag. decipiens* and *Kr. subtilis* are very rare. Besides the species mentioned above, *Sag. crassa* (small form) seems to occur in the inlet waters along the western coast of Kyûsyû.

b) *The Yellow Sea.* A branch of the Tusima Current, the West Tyôsen Current, flows northwards into the central area of the Yellow Sea, where it turns eastwards and then southwards along the western coast of Tyôsen. Here it is diluted a great deal by the freshwater discharged by many rivers of the mainland. *Sag. crassa* (large and, probably the small forms too) occur abundantly in this southward current (the Tyôsen Coastal Current). Of the oceanic forms expected from the West Tyôsen Current, only *Sag. bedoti* is represented. The pelagic fauna of the southward Chinese Coastal Current in the western Yellow Sea is not yet fully known.

c) *The Tyôsen Strait.* The Tyôsen Coastal Current turns eastwards around the southwest point of Tyôsen and flows along its southern coast confluent with the Tusima Current. In the coastal waters, brackish or inlet water forms like *Sag. crassa* (large and small forms), and some oceanic forms like *Sag. enflata* and *Sag. bedoti* are mingled in various proportions. In the materials from the offshore Tusima Current occur *Sag. enflata, Sag. bedoti, Sag. robusta, Sag. ai, Sag. bipunctata* and *Sag. serratodentata* and also a few individuals of *Sag. pulchra, Sag. crassa* and *Kr. pacifica.*

d) *The Japan Sea.* The waters off the east coast of Tyôsen is influenced in the northern half by the cold Liman Current and in the southern half by a northward influx of the Tusima Current which may extend to near Seisin in summer and autumn. In these seasons, the Coastal Current along the south coast of Tyôsen seems to flow northwards with the influx of the Tusima Current. Most of *Sag. crassa* (small forms) found in the Japan Sea may be due to this coastal current, although it is not impossible that some individuals arise also in some bays like Eikô Bay. *Sag. elegans* is common in the northern area influenced by the Liman Current and may reach as far south as St. 24 in winter to spring when the Current is in the dominant phase. The warm oceanic water forms found in this collection are *Sag. bedoti, Sag. enflata, Sag. robusta, Sag. ai, Sag. serratodentata, Sag. regularis* and *Sag. neglecta.*

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Station	Date	Long. & Lat.	Net.	Salinity ‰	Temp. t°C	*Sag. hexaptera*	*Sag. lyra*	*Sag. enflata*	*Sag. bedoti*	*Sag. pulchra*	*Sag. bipunctata*	*Sag. robusta*	*Sag. ai*	*Sag. neglecta*	*Sag. regularis*	*Sag. crassa*	*Sag. serratodentata*	*Sag. minima*	*Sag. decipiens*	*Sag. elegans*	*Sag. ?*	*Kr. pacifica*	*Kr. subtilis*	*Pterosag. draco*	Sum
1	VII, 5, 36	39° 53′ 30″ N 139° 33′ 00″ E	A	33.06	19.40				70																70
2	VII, 6, 36	40° 16′ 00″ N 138° 46′ 00″ E	A	33.89	15.25				13											15					28
3	VII, 6, 36	41° 30′ N 135° 42′ E	A	33.84	15.09															80					80
4	VII, 7, 36	41° 50′ N 134° 57′ E	A	33.69	14.25															85					85
5	VI, 6, 38	ca. 41° 55′ N 132° 15′ E	A		10.5															47					47
5	VII, 2, 38	ca. 41° 55′ N 132° 15′ E	A		14.3															142					142
6	VII, 7, 36	42° 26′ N 131° 30′ E	A	33.57	14.95															80					80
7	VII, 8, 36	42° 15′ N 130° 51′ E	A	33.12	15.59															303	1				304
8	VII, 8, 36	42° 11′ 00″ N 130° 32′ 00″ E	A	31.94	16.01															115					115
9	VI, 9, 38	ca. 41° 45′ N 130° 15′ E	A		13.2															28					28
9	VII, 3, 38	ca. 41° 45′ N 130° 15′ E	A		15.0															41					41

10	VI, 7, 38	ca. 41° 15′ N 130° 45′ E	A		11.7														83				83
11	VII, 11, 36	41° 00′ 00″ N 131° 00′ 00″ E	A	33.62	18.26														86				86
12	VII, 12, 36	40° 54′ 30″ N 130° 28′ 30″ E	A	33.33	17.37														230				230
13	VII, 12, 36	40° 48′ 30″ N 129° 58′ 30″ E	A	32.88	17.49														74				74
14	IX, 4, 38	ca. 40° 35′ N 129° 35′ E	A		22.2												30						30
15	VII, 5, 38	ca. 40° 15′ N 128° 45′ E	A		17.3														250				250
15	VIII, 15, 38	ca. 40° 15′ N 128° 45′ E	A		24.4												35						35
16	IX, 13, 38	ca. 40° 15′ N 130° 45′ E	A		19.2			1	34		3												38
17	VI, 22, 38	ca. 39° 15′ N 128° 15′ E	A		14.9														28				28
18	VIII, 31, 38	ca. 39° 05′ N 130° 05′ E	A		26.3				14		12												26
19	IX, 17, 38	ca. 38° 15′ N 128° 45′ E	A		20.8				77								2				3		82
20	IX, 20, 38	ca. 38° 15′ N 129° 45′ E	A		20.8			1	48								1						50
21	IX, 23, 38	ca. 38° 15′ N 130° 45′ E	A		23.2			49	22			2									1		74
22	VIII, 10, 38	ca. 38° 15′ N 131° 45′ E	A		27.3				106		1										35		142
23	VI, 22, 38	ca. 37° 45′ N 129° 15′ E	A		16.9														36				36
23	IX, 16, 38	ca. 37° 45′ N 129° 15′ E	A		21.7				15		3						24						42

Station	Date	Long. & Lat.	Net.	Salinity ‰	Temp. t°C	*Sag. hexaptera*	*Sag. lyra*	*Sag. enflata*	*Sag. bedoti*	*Sag. pulchra*	*Sag. bipunctata*	*Sag. robusta*	*Sag. ai*	*Sag. neglecta*	*Sag. regularis*	*Sag. crassa*	*Sag. serratodentata*	*Sag. minima*	*Sag. decipiens*	*Sag. elegans*	*Sag. ♀*	*Kr. pacifica*	*Kr. subtilis*	*Pterosag. draco*	Sum
24	VI, 24, 38	ca. 37° 15′ N 129° 45′ E	A		16.3															42					42
24	VII, 8, 38	ca. 37° 15′ N 129° 45′ E	A		20.5				120												3				123
24	IX, 15, 38	ca. 37° 15′ N 129° 45′ E	A		21.7			16	50			4	1			6					6				83
25	VIII, 20, 38	ca. 37° 15′ N 130° 45′ E	A		27.0				33			5													38
25	X, 28, 38	ca. 37° 15′ N 130° 45′ E	A		19.5			3	137			3									2				145
26	IX, 21, 38	ca. 37° 25′ N 130° 55′ E	A		22.9			54	8			1	3												66
27	VIII, 22, 38	ca. 37° 15′ N 131° 35′ E	A		25.3			5	43			1			1						3				53
28	VII, 29, 38	ca. 36° 25′ N 129° 35′ E	A						43																43
29	IX, 28, 38	ca. 36° 15′ N 129° 45′ E	A		21.6			11	73					2		1					20				107
30	IX, 27, 38	ca. 36° 15′ N 130° 45′ E	A		21.8			50	17			2				1					1				71
30	VIII, 23, 38	ca. 36° 15′ N 130° 45′ E	A		26.1			1	38			2			1	1									43

31	IX, 26, 38	ca. 36° 15′ N 131° 45′ E	A		22.8			8	18			1									2			29
32	IX, 23, 38	ca. 36° 15′ N 132° 45′ E	A		24.8			4	6			1												11
33	II, 10, 37	35° 29′ 00″ N 129° 27′ 35″ E	A	34.42	12.75			3	2				10			11	1							27
34	III, 13, 39	35° 11′ 20″ N 129° 52′ 50″ E	A	34.56	13.61				6															6
34	VII, 21, 36	35° 11′ 20″ N 129° 52′ 50″ E	A	31.89	24.61			4	6			2	5									3		20
35	III, 12, 37	34° 52′ 10″ N 130° 21′ 00″ E	A	34.54	13.92				25															25
36	II, 10, 37	34° 45′ 40″ N 130° 30′ 30″ E	A	34.52	15.13				1		1		1											3
36	III, 12, 37	34° 45′ 40″ N 130° 30′ 30″ E	A	34.52	14.16				14															14
36	VII, 21, 36	34° 45′ 40″ N 130° 30′ 30° E	A	32.09	24.53				48			1	2								1			52
37	VI, 10, 36	34° 39′ 15″ N 130° 39′ 40″ E	A	34.51	19.23				50												2	2		54
37	VII, 21, 36	34° 39′ 15″ N 130° 39′ 40″ E	A	32.74	24.85			3	62		1	3	1											70
38	VII, 21, 36	34° 32′ 40″ N 130° 48′ 50″ E	A	33.48	24.45			3	19			13												35
39	I, 15, 38	34° 35.5′ N 129° 57.0′ E						12	4		1					3	2							22
40	VII, 2, 38	off Makinosima Husan	A						140															140
41	VI, 16, 38	Katoku—Kyosai-to Keinan	B		19.3				75							2					1			78
42	VI, 16, 38	Near Kyosai-to Keinan	B		19.5				24							1								25

Station	Date	Long. & Lat.	Net.	Salinity ‰	Temp. t°C	*Sag. hexaptera*	*Sag. lyra*	*Sag. enflata*	*Sag. bedoti*	*Sag. pulchra*	*Sag. bipunctata*	*Sag. robusta*	*Sag. ai*	*Sag. neglecta*	*Sag. regularis*	*Sag. crassa*	*Sag. serratodentata*	*Sag. minima*	*Sag. decipiens*	*Sag. elegans*	*Sag. ?*	*Kr. pacifica*	*Kr. subtilis*	*Pterosag. draco*	Sum
43	V, 31, 38	ca. 34° 45′ N 128° 45′ E	A		17.7				33							12									45
44	VII, 25, 38	ca. 34° 25′ N 128° 25′ E	A		26.5				32																32
45	IX, 22, 38	34° 52.5′ N 128° 46.0′ E	A	34.04	22.5			37	9		1		1								2				50
45	IX, 22, 38	34° 52.5′ N 128° 46.0′ E	B(34)	(31.91)	(14.4)			21	37				1												59
46	IX, 22, 38	34° 59.8′ N 128° 44.2′ E	A	31.91	22.4			19	20				4												43
46	IX, 22, 38	34° 59.8′ N 128° 44.2′ E	B(32)	(34.31)	(14.4)			17	7	1															25
47	IX, 22, 38	34° 47.0′ N 128° 41.7′ E	A	32.01	21.7			17	11							1					6				35
47	IX, 22, 38	34° 47.0′ N 128° 41.7′ E	B(26)	(33.44)	(11.5)			17	22																39
48	IX, 23, 38	34° 42.0′ N 128° 37.2′ E	B(26)	32.63(32.90)	18.9(17.8)			4	58																62
49	IX, 23, 38	34° 43.4′ N 128° 31.0′ E	B(32)	32.66(32.92)	20.0(18.7)			4	43																47
50	IX, 24, 38	34° 42.0′ N 128° 28.0′ E	B(61)	32.77(32.99)	19.3(17.4)			12	24																36

51	IX, 25, 38	34° 45.7′ N 128° 05.7′ E	A	32.16	21.6			43														43
52	IX, 26, 38	34° 49.8′ N 128° 19.2′ E	B(32)	32.59(32.79)	20.7(19.5)			2	26													28
53	IX, 26, 38	34° 54.5′ N 128° 29.0′ E	A	32.56	22.5			4	2							29						35
54	IX, 26, 38	35° 00.8′ N 128° 36.3′ E	A	32.41	22.5			21								4						25
55	IX, 26, 38	35° 05.7′ N 128° 41.2′ E	A	32.30	21.5			2	30							66				1		99
56	IX, 27, 38	35° 04.2′ N 128° 44.5′ E	B(21)	32.47(32.43)	20.3(20.6)				5													5
57	IX, 27, 38	34° 59.5′ N 128° 52.7′ E	A	32.52	18.0			1														1
58	VIII, 30, 38	34° 00′ 00″ N 126° 00′ 00″ E	B(76)	30.95(33.30)	25.33(11.58)				48							3						51
59	VIII, 28, 38	34° 26′ 00″ N 126° 03′ 00″ E	B(31)	32.36(32.20)	21.96(21.13)				29													29
60	VIII, 28, 38	34° 37′ 00″ N 126° 15′ 00″ E	B(10)	32.20(32.12)	24.27(24.24)				27													27
61	VIII, 26, 38	34° 47′ 00″ N 126° 14′ 30″ E	A	32.14	25.65											40						40
61	VIII, 26, 38	34° 47′ 00″ N 126° 14′ 30″ E	B(15)	(32.41)	(25.30)				20							2						22
62	VIII, 26, 38	34° 59′ 00″ N 126° 03′ 10″ E	B(9)	32.18(32.20)	25.83(25.01)				20													20
63	VIII, 26, 38	35° 10′ 00″ N 125° 58′ 00″ E	A	32.38	25.30				1							74						75
63	VIII, 26, 38	35° 10′ 00″ N 125° 58′ 00″ E	B (12.5)	32.34	25.14				10							1						11
64	VIII, 26, 38	35° 20′ 00″ N 126° 06′ 00″ E	A	32.34	24.91											69						69

Station	Date	Long. & Lat.		Net.	Salinity ‰	Temp. t°C	*Sag. hexaptera*	*Saa. lyra*	*Sag. enflata*	*Sag. bedoti*	*Sag. pulchra*	*Sag. bipunctata*	*Sag. robusta*	*Sag. ai*	*Sag. neglecta*	*Sag. regularis*	*Sag. crassa*	*Sag. serratodentata*	*Sag. minima*	*Sag. decipiens*	*Sag. elegans*	*Sag. ?*	*Kr. pacifica*	*Kr. subtilis*	*Pterosag. draco*	Sum
65	V, 17, 38	35° 48.4′ 126° 21.0′	N E	B(21)	31.69(31.62)	12.0(11.9)				62							186									248
66	VIII, 25, 38	36° 10′ 00″ 126° 25′ 00″	N E	B (5)	31.55(31.60)	25.90(25.91)				62							2									64
67	VIII, 25, 38	36° 27′ 00″ 126° 27′ 00″	N E	B(26)	31.87(31.64)	25.71(25.56)				13							15									28
68	V, 18, 38	36° 12.0′ 125° 24.5′	N E	B(61)	31.87(31.80)	14.0(6.1)											83									83
69	V, 21, 38	36° 46.2′ 124° 43.2′	N E	B(81)	32.23(32.10)	12.8(6.3)				2							144									146
70	V, 21, 38	36° 53.8′ 124° 27.2′	N E	B(81)	32.21(32.12)	13.6(6.8)				5							503									508
71	VI, 3, 38	37° 43.1′ 125° 41.3′	N E	B(21)		18.3											175									175
72	VI, 3, 38	37° 38.6′ 125° 33.9′	N E	B(16)	30.43(30.41)	17.2(16.7)											108									108
73	VI, 3, 38	37° 36.8′ 125° 29.2′	N E	B(25)													145									145
74	VI, 3, 38	37° 36.2′ 125° 21.8′	N E	B(30)		14.6											227									227
75	VI, 1, 38	37° 50.0′ 124° 52.2′	N E	B(35)	31.40(31.42)	12.2(12.2)											71									71

76	VI, 2, 38	37° 39.0′ N 124° 33.9′ E	B(75)	31.96(31.89)	14.6(8.2)				2						514								516
76a	VI, 2, 38		B						3						87								90
77	VI, 1, 38	Ôaosima anchorage	B		11.9										84								84
78	V, 30, 38	39° 02.2′ N 124° 32.5′ E	B(39)	31.38(31.36)	8.5(9.2)										57								57
79	V, 30, 38	39° 34.5′ N 124° 04.0′ E	B(18)	30.30(30.30)	13.0(11.6)										109								109
80	V, 24, 38	39° 15.8′ N 123° 19.5′ E	B	31.18(31.74)	11.9										62								62
81	II, 12, 38	32° 37.0′ N 128° 20.0′ E	A		14.5	2	2	10				1				9	1	4				4	33
82	II, 12, 38	32° 28.5′ N 128° 31.0′ E	A		15.0	1		26	3						1	15	7					5	60
83	II, 18, 37	32° 31′ 30″ N 129° 18′ 30″ E	A	34.67	16.47	1		6	7	1	1	1									1	2	20
84	III, 5, 37	32° 03′ 00″ N 128° 30′ 30″ E	A	34.70	18.01				31							3							34
85	III, 5, 37	30° 03′ 00″ N 128° 49′ 00″ E	A	34.65	18.00			2	49		2					1				1			55
86	III, 5, 37	32° 04′ 00″ N 129° 14′ 00″ E	A	34.67	17.67				45	7	10	1				3							66
87	III, 5, 37	32° 05′ 30″ N 129° 36′ 25″ E	C (?–100)	34.63(34.36)	16.61(5.94)			2	5					1						1			9
88	III. 5. 37	32° 07′ 00″ N 129° 48′ 00″ E	A		16.58				19														19

Station	Date	Long. & Lat.	Net.	Salinity ‰	Temp. t°C	*Sag. hexaptera*	*Sag. lyra*	*Sag. enflata*	*Sag. bedoti*	*Sag. pulchra*	*Sag. bipunctata*	*Sag. robusta*	*Sag. ai*	*Sag. neglecta*	*Sag. regularis*	*Sag. crassa*	*Sag. serratodentata*	*Sag. minima*	*Sag. decipiens*	*Sag. elegans*	*Sag. ?*	*Kr. pacifica*	*Kr. subtilis*	*Pterosag. draco*	Sum
89	III, 3, 37	31° 44′ 00″ N 130° 07′ 00″ E	A	34.76	18.54				23		2		2				15							1	43
90	II, 21, 37	31° 08′ 10″ N 130° 35′ 50″ E	A	34.47	15.78			32	2		2	29	1				1				1	1		1	72
91	II, 20, 37	30° 48′ 15″ N 130° 20′ 50″ E	A	34.79	20.57	3		10	11		2	10	1												37
91	II, 20, 37		A		21.32			29			4	19	1								2	6			61
92	II, 21, 37	30° 41′ 00″ N 130° 30′ 00″ E	A		20.05			14	4		4	4				12									38
93	II, 21, 37	30° 52′ 30″ N 130° 32′ 00″ E	A		20.24	3		12	2		1						5				1		1	1	26
94	II, 25, 37	30° 56′ 00″ N 130° 50′ 00″ E	A	34.69	20.82			16	8	1	5	26	10		2		16				4				88
94a	II, 25, 37		A					3	2			7									1				13
95	II, 26, 37	30° 56′ 00″ N 131° 06′ 30″ E	A		20.75			12	17	2		43	11									1			86

96	II, 26, 37	30° 46, 30″ N 131° 11′ 00″ E	A	34.81	19.85				4		9	2												15
97	II, 26, 37	30° 28′ 30″ N 131° 19′ 30″ E	A	34.88	21.94			14	10	2	20	3									1			50
98	II, 20, 37	30° 24′ 00″ N 130° 12′ 40″ E	A	34.90	21.93			4		18	33	4			1			1	2					63
99	II, 27, 37	30° 20′ 00″ N 130° 11′ 00″ E	A	34.72	19.70			18	14	3	5													40
99a	III, 3, 37		A					11	45		4	1			14							1		76
100	II, 27, 37	30° 07′ 00″ N 130° 41′ 00″ E	A	34.78	21.34			10		3	7	2										1		23
101	II, 27, 37	29° 55′ N 131° 13′ E	A	34.78	21.71	1		8	1	1					1									12
102	II, 27, 37	29° 38′ 30″ N 131° 41′ 30″ E	A	34.83	21.44	2		15		5	4	1										1		28
103	IX, 1, 38	30° 49.0′ N 122° 26.0′ E	A						8															8
104	VIII, 14, 38	30° 41.2′ N 122° 24.1′ E	A						29															29
104	VIII, 20, 38	30° 41.2′ N 122° 24.1′ E	A					1	37															38
105	VIII, 13, 38	30° 41.3′ N 122° 24.3′ E	A					2	23															25
105	VIII, 14, 38	30° 41.3′ N 122° 24.3′ E	A						30															30
105	IX, 7, 38	30° 41.3′ N 122° 24.3′ E	A					1	18															19

Station	Date	Long. & Lat.	Net.	Salinity ‰	Temp. t°C	*Sag. hexaptera*	*Sag. lyra*	*Sag. enflata*	*Sag. bedoti*	*Sag. pulchra*	*Sag. bipunctata*	*Sag. robusta*	*Sag. ai*	*Sag. neglecta*	*Sag. regularis*	*Sag. crassa*	*Sag. serratodentata*	*Sag. minima*	*Sag. decipiens*	*Sag. elegans*	*Sag.* ?	*Kr. pacifica*	*Kr. subtilis*	*Pterosag. draco*	Sum
106	VIII, 30, 38	30° 35.0′ N 123° 21.0′ E	D	21.15*	27.5			7	2																9
107	IX, 11, 38	30° 20.0′ N 122° 07.7′ E	A						32																32
108	IX, 10, 38	30° 15.7′ N 122° 13.8′ E	A						20																20
109	IX, 12, 38	29° 58.5′ N 122° 22.5′ E	A						19																19
110	IX, 11, 38	29° 58.0′ N 122° 22.5′ E	A						37																37
111	IX, 14, 38	29° 12.0′ N 122° 28.0′ E	A					1	2																3
Total						13	2	715	2683	4	66	291	73	2	5	3004	90	8	4	1765	102	15	2	17	8861

A Young fish surface tow-net (130 cm diameter – 460 cm length, cloth 1500–1700/100 cm^2 in anterior half – 290/1 cm^2 in posterior half), towed 10 minutes in the speed of 2 kt.

B Young fish beam-trawl (120 × 40 cm^2 – 250 cm length, cloth 980/100 cm^2), towed 10–20 minutes in the speed of 2 kt. The bracketed number indicates the depth where the net was towed.

C A used for the vertical haul.

D Quantitative plankton net (diameter 22 cm at the entrance, 44 cm at the largest portion).

* Density based on the amount of Cl.

Mollusca Dredged from off the Coast of Hukui Prefecture in the Japan Sea

By

Sitihei Nomura and Hirosi Niino

(With 1 Plate)

Introduction

The present article is based chiefly upon the molluscan shells procured by the junior writer from Wakasa Bay and Gentatuse, a submarine bank off the said bay, Hukui Prefecture in the Japan Sea. The junior writer with the aid of the surveying ship Hukui-maru of the Hukui Prefectural Fisheries Experimental Station at Hukui, made three trips to sea for the purpose of dredge operation and other oceanographical observations, namely, in the early part of December 1935, in the early part of August 1937, and in the early part of September 1937. Besides these three surveys, he also made a special trip to Urasimasyô, a submarine bank off Hukui Prefecture in 1937. Other surveys in the waters off Hukui Prefecture, are by the members of Hukui Prefectural Fisheries Experimental Station with the vessel Hukui-maru and by the members of the Kyôto Fisheries Institute with the vessel Syôwa-maru. A very few specimens have also been dredged by the Imperial Fisheries Experimental Station with the vessel Sôyô-maru.

The many dredgings and other oceanographical observations by the above mentioned surveying ships have resulted in the accumulation of a large marine fauna, among which K. Hatai[1] has already reported on the brachiopods and K. Asano[2] on the foraminifers, and the present article treats the molluscan fauna.

Owing to the junior writers leave abroad, most oceanographical data, as depth of each station, bottom material, bottom and surface temperatures, specific gravity of bottom water and a detail chart indicating the latitude and longitude of each station are not known, but a future article is expected to be published in concern. In the present report it may be worthy to mention that the specimens were

dredged from the depths of 50–300 meters off Hukui Prefecture.[3)]

The specimens of the present article are now preserved in the collection of the Saitô Hô-on Kai Museum, Sendai, while the complete collection is stored in the Imperial Fisheries Institute, Tôkyô.

Before going further, the writers wish to thank the members of the Hukui Prefectural Fisheries Experimental Station and the Kyôto Fisheries Experimental Station for the great assistance given to the junior writer during his oceanographical works in the waters off Hukui Prefecture, and also for kindly encouraging the present work. Acknowledgements are also due to Mr. Sinozaki for taking the necessary photographs.

Although K. Asano recorded a total of 132 species from the Urasimasyô, it is regretted that he gives no precise oceanographical accounts except for stating the depths of the stations from where his material came. The stations and depths mentioned by him are, St. 2, 11.5 m., St. 3, 220 m., St. 4, 227 m., St. 5, 198 m., St. 6, 190 m., St. 7, 130 m., St. 8, 190 m., St. 9, 180 m., St. 10, 110 m. From the foraminifers and depths of the stations, he distinguished two groups, the one is in the depth of 100 m., or thereabout (St. 2, 7 and 10), and the other is in the depth of 200 m., or thereabout (St. 3, 4, 5, 6, 8 and 9).

K. Hatai in his study of the brachiopods, gave the following oceanographical data.

1. 1st dredge operation made by Niino

St. 2, 36°11′51″N., 135°12′15″E., 109 m. St. 3, 36°12′18″N., 135°43′12″E., 64 m. St. 5, 36°13′20″N., 135°42′12″E., 58 m. St. 6, 36°14′02″N., 135°46′06″E., 87 m. St. 7, 36°15′14″N., 135°45′18″E., 119 m. St. 8, 36°14′14″N., 135°44′36″E., 115 m. St. 9, 36°13′36″N., 135°43′36″E., 114 m. St. 10, 36°13′03″N., 135°42′36″E., 159 m. St. 11, 36°12′24″N., 135°41′48″E., 119 m. St. 13, 36°11′36″N., 135°44′02″E., 99 m. St. 14, 36°12′12″N., 135°45′00″E., 100 m.

2. 2nd dredge operation made by Niino

St. 1–3, 36°18′54″N., 136°05′48″E., 88 m., bott. temp., 18.1°C. St. 6, 36°19′36″N., 136°02′30″E., 98 m., bott. temp., 16.5°C. St. 2–7, 36°17′16″N., 136°04′24″E., 89 m., bott temp., 17.5°C. St. 2–8, 36°15′58″N., 136°05′38″E., 73 m., bott temp., 19.8°C.

3. 3rd dredge operation made by Niino

St. 3, 35°12′45″N., 134°24′12″E., 17 m., 22.4°C, fine sand and shells. St. 7, 35°57′30″N., 135°21′24″E., 110 m., 18.6°C, sand and rocks. St. 7′, 35°57′56″N., 135°19′54″E., 116 m., 18.6°C, rocks. St. 10, 35°53′06″N., 135°15′36″E., 148 m.,

11.2°C, sand and gravel. St. 19, 35°50′36″N., 135°13′18″E., 123 m., 12.5°C, rocks and sand. St. 25, 36°50′18″N., 125°20′06″E., 125 m., 16.0°C, gravel and mud. St. 39, 36°43′12″N., 135°27′00″E., 88 m., 21.5°C, gravel and sand. St. 45, 35°54′06″N., 135°19′24″E., 133 m., 13.0°C, rocks and gravel. St. 46, 35°53′18″N., 135°18′00″E., 236 m., 3.0°C, fine sand and shells.

In the present collection the writers discovered many species originally described as fossil, but no trace was found of the fossil marine fauna of S. NOMURA and K. HATAI,[4] or of the submerged geological formation of K. HATAI.[5] These two features are the outstanding results of the present paper.

References

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5) K. HATAI.—A Geological Consideration of the Fossils Dredged from Japanese Seas. Geologie de Meere- und Binnengewässer, Bd. 3, Heft 3, S. 366–374, 1939.

6) T. KURODA.—Catalogue of the Mollusca of Hukui-ken, pp. 169–205, 1933. (T. KURODA's work does not treat the molluscs from an oceanographical side, but only those of a strand-line collection). However it is of interest to compare his with the present list.

Station and Fauna

Mollusca dredged by the Hukui-maru from Wakasa Bay, Hukui Prefecture, in the first attempt.

St. 2 (IW):—*Cardita nodulosa* LAMARCK, *Chlamys parirregularis* NOMURA and HATAI,
Hiatella arctica LINNÉ, *Lima goliath* SMITH,
Lima japonica A. ADAMS, *Ostrea musashiana* YOKOYAMA,
Argobuccinum oregonense REDFIELD, *Calliostoma hungerfordi* SOWERBY,
Emarginula crassicostata SOWERBY, *Emarginula foveolata* SOWERBY,
Turcica imperialis A. ADAMS.

St. 3 (IW):—*Arca ocellata* Reeve, *Cardita cumingiana* Dunker, *Cardita nodulosa* Lamarck, *Chlamys parirregularis* Nomura and Hatai, *Chlamys vesiculosa* Dunker, *Glycymeris pilsbryi* Yokoyama, *Joannisiella cumingi* Hanley, *Lima japonica* A. Adams, *Ostrea musashiana* Yokoyama, *Venericardia ferruginea* A. Adams, *Homalopoma amusitatum* Gould, *Liotina semiclathratula* Schrenck.

St. 5 (IW):—*Arca ocellata* Reeve, *Barbatia plicata* Dillwyn, *Barbatia stearnsi* Pilsbry, *Cardita nodulosa* Lamarck, *Chama reflexa* Reeve, *Chlamys vesiculosa* Dunker, *Clavagella japonica* Yokoyama, *Glycymeris pilsbryi* Yokoyama, *Lima japonica* A. Adams, *Lima lima* Linné, *Ostrea musashiana* Yokoyama, *Ostrea rosacea* Deshayes, *Venericardia ferruginea* A. Adams, *Venus toreuma* Gould, *Acmaea conulus* Dunker, *Liotina semiclathratula* Schrenck, *Olivella fulgurata* Adams and Reeve, *Murex wakasaensis* n. sp., *Puncturella nobilis* A. Adams, *Triphora otsuensis* Yokoyama, *Turcica imperialis* A. Adams.

St. 6 (IW):—*Arca ocellata* Reeve, *Cardita nodulosa* Lamarck, *Cardium samarangae* Makiyama, *Chlamys parirregularis* Nomura and Hatai, *Chlamys vesiculosa* Dunker, *Glycymeris pilsbryi* Yokoyama, *Hiatella arctica* Linné, *Lima japonica* A. Adams, *Lima lima* Linné, *Ostrea musashiana* Yokoyama, *Poromya flexuosa* Yokoyama, *Pseudogrammatodon dalli* Smith, *Venericardia ferruginea* A. Adams, *Calliostoma hungerfordi* Sowerby, *Mitrella anachisoides* n. sp., *Mitrella varians burchardi* Dunker, *Peristernia coreanica* Smith, *Puncturella nobilis* A. Adams, *Turcica imperialis* A. Adams.

St. 7 (IW):—*Cardita nodulosa* Lamarck, *Cardium samarangae* Makiyama, *Chlamys nipponensis* Kuroda, *Chlamys parirregularis* Nomura and Hatai, *Chlamys vesiculosa* Dunker, *Lima japonica* A. Adams, *Meiocardia tetragona* Adams and Reeve, *Ostrea musashiana* Yokoyama, *Pitar subpellucida* Sowerby, *Pseudogrammatodon dalli* Smith, *Lora gentatuana* n. sp., *Siliquaria cumingi* Mörch, *Turcica imperialis* A. Adams.

St. 8 (IW):—*Aloides scaphoides* Hinds, *Cardita nodulosa* Lamarck, *Chlamys parirregularis* Nomura and Hatai, *Chlamys vesiculosa* Dunker, *Hiatella arctica* Linné, *Lima japonica* A. Adams, *Lima lima* Linné, *Meiocardia tetragona* Adams and Reeve, *Pitar subpellucida* Sowerby, *Pseudamusium intuscostatum tenuicostulatum* Yokoyama, *Venericardia ferruginea* A. Adams, *Volsella margaritacea* Nomura and Hatai, *Cylichna musashiensis* Tokunaga.

St. 9 (IW):—*Arca ocellata* Reeve, *Barbatia plicata* Dillwyn,

Cardita nodulosa LAMARCK, *Chlamys parirregularis* NOMURA and HATAI,
Chlamys vesiculosa DUNKER, *Glycymeris pilsbryi* YOKOYAMA,
Hiatella arctica LINNÉ, *Lima japonica* A. ADAMS,
Ostrea musashiana YOKOYAMA, *Pseudogrammatodon dalli* SMITH,
Emarginula foveolata SOWERBY, *Natica clausa* BRODERIP and SOWERBY,
Siphonalia spadicea REEVE.

St. 10 (IW) :—*Chlamys vesiculosa* DUNKER, *Hiatella arctica* LINNÉ,
Ostrea musashiana YOKOYAMA

St. 11 (IW) :—*Astarte alaskensis* DALL, *Cardium samarangae* MAKIYAMA,
Crassatellites nanus ADAMS and REEVE, *Limopsis crenata* A. ADAMS,
Limopsis pelagica SMITH, *Pseudamusium intuscostatum tenuicostulatum* YOKOYAMA,
Dentalium rhabdotum PILSBRY, *Argobuccinum oregonense* REDFIELD,
Cylichna yamakawai YOKOYAMA, *Puncturella nobilis* A. ADAMS.

St. 12 (IW) :—*Cardita nodulosa* LAMARCK, *Chlamys parirregularis* NOMURA and HATAI,
Chlamys vesiculosa DUNKER, *Glycymeris pilsbryi* YOKOYAMA,
Hiatella arctica LINNÉ, *Ostrea musashiana* YOKOYAMA,
Pododesmus radiatus SOWERBY, *Natica clausa* BRODERIP and SOWERBY.

St. 123IW) :—*Cardita nodulosa* LAMARCK, *Chlamys parirregularis* NOMURA and HATAI,
Chlamys vesiculosa DUNKER, *Glycymeris pilsbryi* YOKOYAMA,
Joannisiella cumingi HANLEY, *Lima japonica* A. ADAMS,
Lima lima LINNÉ, *Limopsis s-kinoshitai* KURODA,
Ostrea musashiana YOKOYAMA, *Poromya flexuosa* YOKOYAMA,
Thracia transmontana YOKOYAMA, *Venericardia ferruginea* A. ADAMS,
Dentalium crocinum DALL, *Cavolina longirostris* LESSEUR,
Colus mitrellaformis NOMURA (MS), *Fusinus simplex* SMITH?,
Peristernia coreanica SMITH.

St. 14 (IW) :—*Arca ocellata* REEVE, *Barbatia plicata* DILLWYN,
Chama reflexa REEVE, *Chlamys parirregularis* NOMURA and HATAI,
Chlamys vesiculosa DUNKER, *Crassatellites nanus* ADAMS and REEVE,
Glycymeris pilsbryi YOKOYAMA, *Lima lima* LINNÉ,
Meiocardia tetragona ADAMS and REEVE, *Ostrea musashiana* YOKOYAMA,
Pitar subpellucida SOWERBY, *Spondylus cruentus* LISCHKE,
Venus toreuma GOULD, *Emarginula foveolata* SOWERBY,
Siphonalia spadicea REEVE, *Turcica imperialis* A. ADAMS.

St. 15 (IW) :—*Chama reflexa* REEVE.

Mollusca dredged by the Hukui-maru from Wakasa Bay, Hukui Prefecture, in the second attempt.

St. 3 (IIW) :—*Pitar subpellucida* SOWERBY.

St. 7 (IIW) :—*Cardita nodulosa* LAMARCK, *Chalmys parirregularis* NOMURA and HATAI,
Chlamys vesiculosa DUNKER, *Hiatella arctica* LINNÉ,
Lima japonica A. ADAMS, *Limopsis crenata* A. ADAMS,
Ostrea musashiana YOKOYAMA, *Pseudogrammatodon dalli* SMITH,
Pseudogrammatodon pacificus NOMURA and ZINBÔ, *Venericardia ferruginea* A. ADAMS,
Argobuccinum oregonense REDFIELD, *Emarginula foveolata* SOWERBY,

Emarginula fragilis Yokoyama, *Siliquaria cumingi* Mörch,
Turcica imperialis A. Adams.

St. 16 (IIW) :—*Calopodium japanense* Nomura and Hatai, *Cardium samarangae* Makiyama,
Glycymeris yessoensis Sowerby, *Limopsis crenata* A. Adams,
Myadora fluctuosa Gould, *Acila divaricata* Hinds,
Nuculana yokoyamai Kuroda, *Pitar japonica* Kuroda,
Pitar subpellucida Sowerby, *Scintella* species indet.,
Venus faveolata Sowerby, *Dentalium habutae* Kuroda and Kikuchi,
Cylichna yamakawai Yokoyama, *Mangelia hukuiensis* n. sp.,
Siphonalia spadicea Reeve.

St. 17 (IIW) :—*Acila divaricata* Hinds, *Dentalium toyamense* Kuroda and Kikuchi,

St. 19 (IIW) :—*Chama reflexa* Reeve, *Chlamys irregularis* Sowerby,
Chlamys vesiculosa Dunker, *Crassatellites nanus* Adams and Reeve,
Glycymeris pilsbryi Yokoyama, *Macrocallista sinensis* Sowerby,
Ostrea musashiana Yokoyama, *Pitar subpellucida* Sowerby,
Plicatula simplex Gould, *Pododesmus radiatus* Sowerby,
Spisula bernardi Pilsbry, *Venus toreuma* Gould,
Cylichna musashiensis Tokunaga.

St. 20 (IIW) :—*Cardita nodulosa* Lamarck, *Cardium eoa* Kuroda,
Chama reflexa Reeve, *Chlamys parirregularis* Nomura and Hatai,
Chlamys vesiculosa Dunker, *Glycymeris pilsbryi* Yokoyama,
Lima japonica A. Adams, *Ostrea musashiana* Yokoyama,
Pitar subpellucida Sowerby, *Pseudogrammatodon dalli* Smith,
Spondylus cruentus Lischke, *Taras cumingi* Hanley,
Venus toreuma Gould.

St. 21 (IIW) :—*Anadara troscheli* Dunker, *Arca ocelata* Reeve,
Cardita nodulosa Lamarck, *Cardium samarangae* Makiyama,
Chlamys parirregularis Nomura and Hatai, *Chlamys vesiculosus* Dunker,
Hiatella arctica Linné, *Lima japonica* A. Adams,
Lima lima Linné, *Limopsis crenata* A. Adams,
Limopsis s-kinoshitai Kuroda, *Meiocardia tetragona* Adams and Reeve,
Ostrea musashiana Yokoyama, *Ostrea rosacea* Deshayes ?
Pecten laqueatus Sowerby, *Pholadomya japonica* Dall,
Pseudogrammatodon dalli Smith, *Venericardia ferruginea* A. Adams,
Calliostoma hungerfordi Sowerby, *Emarginula foveolata* Sowerby,
Emarginula fragilis Sowerby, *Homalopoma granuliferum* Nomura and Hatai,
Lora gentatuana n. sp., *Natica figurata* Sowerby,
Peristernia coreanica Smith, *Puncturella nobilis* Sowebry,
Tritonalia lumaria Yokoyama?, *Turcica imperialis* A. Adams,

St. 22 (IIW) :—*Astarte borealis* Schumacher, *Chlamys parirregularis* Nomura and Hatai,
Lima goliath Smith, *Lima smithi* Sowerby,
Limopsis pelagica Smith, *Ostrea musashiana* Yokoyama,
Ostrea rosacea Deshayes, *Panomya nipponica* Nomura and Hatai,
Pseudamusium intuscostatum tenuicostulatum Yokoyama,

Dentalium rhabdotum PILSBRY, *Argobuccinum oregonense* REDFIELD, *Natica clausa* BRODERIP and SOWERBY, *Polinices draconis* DALL, *Turcicula crumpi* PILSBRY.

St. 23(IIW):—*Argobuccinum oregonense* REDFIELD, *Turcicula crumpii* PILSBRY.

St. 26(IIW):—*Aloides scaphoides* HINDS, *Arca ocellata* REEVE, *Barbatia plicata* DILLWYN, *Barbatia symmetrica* REEVE, *Cardita nodulosa* LAMARCK, *Chama reflexa* REEVE, *Chlamys nipponensis* KURODA, *Chlamys vesiculosa* DUNKER, *Glycymeris pilsbryi* YOKOYAMA, *Hiatella arctica* LINNÉ, *Lima japonica* A. ADAMS, *Lima lima* LINNÉ, *Meiocardia tetragona* ADAMS and REEVE, *Montacuta* species indet., *Ostrea musashiana* YOKOYAMA, *Ostrea rosacea* DESHAYES, *Pseudogrammatodon dalli* SMITH, *Pseudogrammatodon pacificus* NOMURA and ZINBÔ, *Spondylus cruentus* LISCHKE, *Thracia transmontana* YOKOYAMA, *Venericardia ferruginea* A. ADAMS, *Venus toreuma* GOULD, *Dentalium rhabdotum* PILSBRY, *Acmaea pygmaea* DUNKER, *Calliostoma hungerfordi* SOWERBY, *Cylichna musashiensis* TOKUNAGA, *Emarginula foveolata* SOWERBY, *Enida japonica* A. ADAMS, *Homalopoma sangarense* SCHRENCK(juv.), *Hyalina japonica* NOMURA and HATAI, *Hyalina perovulum* YOKOYAMA, *Lienardia vadososinuata* n. sp., *Liotina semiclathratula* SCHRENCK, *Lora suganumana* NOMURA(MS), *Natica figurata* SOWERBY, *Polinices draconis* DALL, *Puncturella nobilis* A. ADAMS, *Siliquaria cumingi* MÖRCH, *Siphonalia spadicea* REEVE, *Triphora fusca* DUNKER, *Triphora otsuensis* YOKOYAMA, *Turcica imperialis* A. ADAMS.

St. 27(IIW):—*Chama reflexa* REEVE.

St. 28(IIW):—*Aloides scaphoides* HINDS, *Barbatia plicata* DILLWYN, *Cardita nodulosa* LAMARCK, *Cardium arenicolum* REEVE, *Chama reflexa* REEVE, *Chalmys vesiculosa* DUNKER, *Glycymeris pilsbryi* YOKOYAMA, *Lima lima* LINNÉ, *Lima zushiensis* YOKOYAMA?, *Ostrea rosacea* DESHAYES, *Pitar subpellucida* SOWERBY, *Pseudogrammatodon dalli* SMITH, *Venericardia ferruginea* A. ADAMS, *Liotina semiclathratula* SCHRENCK, *Lora suganumana* NOMURA (MS), *Siliquaria cumingi* MÖRCH.

St. 29(IIW):—*Aloides venustus* GOULD, *Barbatia plicata* DILLWYN, *Barbatia symmetrica* REEVE, *Cardita nodulosa* LAMARCK, *Chlamys parirregularis* NOMURA and HATAI, *Chlamys vesiculosa* DUNKER, *Limopsis crenata* A. ADAMS, *Ostrea musashiana* YOKOYAMA, *Venericardia ferruginea* A. ADAMS.

St. 30(IIW):—*Cardium samarangae* MAKIYAMA, *Poromya flexuosa* YOKOYAMA, *Polinices pila* PILSBRY, *Solariella angulata* TOKUNAGA.

St. 31(IIW):—*Cardium samarangae* MAKIYAMA, *Myadora fluctuosa* GOULD.

St. 32(IIW):—*Barbatia plicata* DILLWYN, *Cardita nodulosa* LAMARCK, *Chama reflexa* REEVE, *Ostrea musashiana* YOKOYAMA,

Venus toreuma GOULD.

St. 33 (IIW) :—*Aloides venustus* GOULD, *Cardita nodulosa* LAMARCK, *Chlamys vesiculosa* DUNKER, *Homalopoma purpurescens* DUNKER, *Lima japonica* A. ADAMS, *Ostrea musashiana* YOKOYAMA, *Pseudogrammatodon dalli* SMITH, *Venericardia ferruginea* A. ADAMS.

St. 34 (IIW) :—*Arca boucardi* JOUSSEUAME, *Cardita nodulosa* LAMARCK, *Chlamys vesiculosa* DUNKER, *Glycymeris yessoensis* SOWERBY, *Hiatella arctica* LINNÉ, *Lima goliath* SMITH, *Lima japonica* A. ADAMS, *Limopsis crenata* A. ADAMS, *Nuculana yokoyamai* KURODA, *Ostrea musashiana* YOKOYAMA, *Ostrea rosacea* DESHAYES, *Pseudogrammatodon dalli* SMITH, *Dentalium habutae* KURODA and KIKUCHI, *Calliostoma haliarchum* MELVILL, *Lora suganumana* NOMURA (MS), *Siphonalia spadicea* REEVE,

St. 35 (IIW) :—*Lima subauriculata* MONTAGU.

St. 36 (IIW) :—*Astarte alaskensis* DALL, *Limopsis pelagica* SMITH, *Turcica imperialis* A. ADAMS.

St. 38 (IIW) :—*Arca ocellata* REEVE, *Cardia nodulosa* LAMARCK, *Cardium samarangae* MAKIYAMA, *Chlamys parirregularis* NOMURA and HATAI, *Chlamys vesiculosa* DUNKER, *Lima goliath* SMITH, *Lima lima* LINNÉ, *Ostrea musashiana* YOKOYAMA, *Ostrea rosacea* DESHAYES, *Poromya flexuosa* YOKOYAMA, *Pseudogrammatodon dalli* SMITH, *Admete hukuiensis* n. sp., *Calliostoma hungerfordi* SOWERBY, *Emarginula foveolata* SOWERBY, *Siliquaria cumingi* MÖRCH, *Turcica imperialis* A. ADAMS.

St. 39 (IIW) :—*Chlamys parirregularis* NOMURA and HATAI, *Chlamys vesiculosa* DUNKER, *Glycymeris yessoensis* SOWERBY, *Hiatella arctica* LINNÉ, *Meiocardia tetragona* ADAMS and REEVE, *Pseudogrammatodon dalli* SMITH, *Argobuccinum oregonense* REDFIELD, *Neptunea arthritica* BERNARDI, *Turcica imperialis* A. ADAMS.

St. 40 (IIW) :—*Arca ocellata* REEVE, *Cardita nodulosa* LAMARCK, *Chama reflexa* REEVE, *Chlamys parirregularis* NOMURA and HATAI, *Hiatella arctica* LINNÉ, *Lima japonica* A. ADAMS, *Limopsis crenata* A. ADAMS, *Lucina acutilineata* CONRAD, *Ostrea musashiana* YOKOYAMA, *Ostrea rosacea* DESHAYES, *Pseudogrammatodon dalli* SMITH, *Venericardia ferruginea* A. ADAMS, *Cylichna musashiensis* TOKUNAGA, *Natica ruflabris* REEVE, *Turcica imperialis* A. ADAMS.

St. 41 (IIW) :—*Cardita nodulosa* LAMARCK, *Chlamys parirregularis* NOMURA and HATAI, *Chlamys vesiculosa* DUNKER, *Hiatella arctica* LINNÉ, *Lima japonica* A. ADAMS, *Limopsis azumana* YOKOYAMA, *Limopsis s-kinoshitai* KURODA, *Pseudogrammatodon dalli* SMITH, *Venericardia ferruginea* A. ADAMS, *Emarginula crassicostata* SOWERBY,

Siliquaria cumingi Mörch, *Turcica imperialis* A. Adams.

St. 42(IIW):—*Cardita nodulosa* Lamarck, *Hiatella arctica* Linné, *Fusinus simplex* A. Adams.

St. 44(IIW):—*Cardita nodulosa* Lamarck, *Cardium samarangae* Makiyama, *Chlamys parirregularis* Nomura and Hatai, *Chlamys vesiculosa* Dunker, *Hiatella arctica* Linné, *Lima lima* Linné, *Ostrea musashiana* Yokoyama, *Ostrea rosacea* Deshayes, *Homalopoma granuliferum* Nomura and Hatai, *Turcica imperialis* A. Adams, *Turcicula crumpi* Pilsbry.

St. 45(IIW):—*Astarte borealis* Schumacher, *Dentalium rhabdotum* Pilsbry.

St. 46(IIW):—*Cardium samarangae* Makiyama, *Hiatella arctica* Linné, *Jonannetia globosa* Quoy and Gaimard, *Lima goliath* Smith, *Limopsis crenata* A. Adams, *Ostrea musashiana* Yokoyama, *Ostrea rosacea* Deshayes, *Dentalium rhabdotum* Pilsbry, *Turcicula crumpi* Pilsbry, *Turritella fascialis* Menke.

St. 47(IIW):—*Cardita nodulosa* Lamarck, *Chlamys parirregularis* Nomura and Hatai, *Hiatella arctica* Linné, *Ostrea musashiana* Yokoyama, *Ostrea rosacea* Deshayes, *Dentalium weinkaufi* Dunker.

St. 48(IIW):—*Cardita nodulosa* Lamarck, *Chlamys parirregularis* Nomura and Hatai, *Chlamys vesiculosa* Dunker, *Lima goliath* Smith, *Lima lima* Linné, *Limopsis crenata* A. Adams, *Ostrea musashiana* Yokoyama, *Venericardia ferruginea* A. Adams.

St. 49(IIW):—*Limopsis pelagica* Smith.

St. 51(IIW):—*Acila divaricata* Hinds, *Neptunea intersculpta* Sowerby.

St. 52(IIW):—*Anatina yokohamensis* Pilsbry ?, *Tellina jedoensis* Lischke, *Philine japonica* Listhke?.

St. 53(IIW):—*Astarte alaskensis* Dall, *Astarte borealis* Schumacher, *Cardium bülowi* Rolle, *Chlamys squamosa* Gmelin, *Chlamys vesiculosa* Dunker, *Crassatellites nanus* Adams and Reeve, *Glycymeris pilsbryi* Yokoyama, *Glycymeris yessoensis* Sowerby, *Hiatella arctica* Linné, *Limopsis crenata* A. Adams, *Limopsis pelagica* Smith, *Meiocardia tetragona* Adams and Reeve, *Ostrea musashiana* Yokoyama, *Pecten laqueatus* Sowerby, *Pitar subpellucida* Sowerby, *Spisula bernardi* Pilsby, *Taras cumingi* Hanley, *Venericardia ferruginea* A. Adams, *Dentalium rhabdotum* Pilsbry *Cuspidaria chinensis* Griffith and Pidgeon, *Enida japonica* A. Adams, *Homalopoma sangarense* Schrenck, *Puncturella fastigiata* A. Adams, *Siphonalia spadicea* Reeve, *Solariella peramabilis pseudobscura* Yokoyama, *Tritonalia lumaria* Yokoyama?, *Turcica imperialis* A. Adams.

St. 54(IIW):—*Astarte borealis* Schumacher, *Limopsis pelagica* Smith, *Lucina acutilineata* Conrad.

Mollusca dredged by the Hukui-maru from Wakasa Bay, Hukui Prefecture, in the third attempt.

St. 1 (IIIW) :—*Cardium undatopictum* PILSBRY, *Macoma praetexta* v. MARTENS, *Macrocallista sinensis* SOWERBY, *Ostrea sinensis* SOWERBY, *Siliqua pulchella* DUNKER, *Tellina jedoensis* LISCHKE, *Lora suturalineata* NOMURA and HATAI, *Terebra lischkeana* DUNKER,

St. 2 (IIIW) :—*Acila divaricata* HINDS, *Chlamys vesiculosa* DUNKER, *Glycymeris yessoensis* SOWERBY, *Limopsis crenata* A. ADAMS, *Limopsis multistriata* FORSKÅL, *Nuculana gordonis* YOKOYAMA, *Pecten laqueatus* SOWERBY, *Poromya flexuosa* YOKOYAMA, *Tellina jedoensis* LISCHKE, *Clavatula consimilis* SMITH, *Siphonalia spadicea* REEVE, *Solariella peramabilis pseudobscura* YOKOYAMA.

St. 3 (IIIW) :—*Chlamys vesiculosa* DUNKER, *Ostrea musashiana* YOKOYAMA, *Pitar pellucida* LAMARCK.

St. 4 (IIIW) :—*Limopsis crenata* A. ADAMS, *Macrocallista sinensis* SOWERBY, *Tellina nitidula* DUNKER, *Venus faveolata* SOWERBY, *Dentalium rhabdotum* PILSBRY, *Ringicula doliaris* GOULD.

St. 5 (IIIW) :—*Pseudamusium intuscostatum tenuicostulatum* YOKOYAMA, *Sarepta speciosa* A. ADAMS, *Dentalium habutae* KURODA and KIKUCHI, *Dentalium nivosum* KURODA and KIKUCHI, *Dentalium rhabdotum* PILSBRY, *Peristernia coreanica* SMITH, *Siphonalia spadicea* REEVE.

St. 6 (IIIW) :—*Cardium samarangae* MAKIYAMA, *Chlamys vesiculosa* DUNKER, *Glycymeris yessoensis* SOWERBY, *Limopsis crenata* A. ADAMS, *Ostrea rosacea* DESHAYES, *Pitar subpellucida* SOWERBY, *Poromya flexuosa* YOKOYAMA, *Sarepta speciosa* A. ADAMS, *Venericardia ferruginea* A. ADAMS, *Venus stimpsoni* GOULD, *Dentalium habutae* KURODA and KIKUCHI, *Dentalium nivosum* KURODA and KIKUCHI, *Dentalium toyamense* KURODA and KIKUCHI, *Enida japonica* A. ADAMS.

St. 7 (IIIW) :—*Aloides rotalis* HINDS, *Barbatia bistrigata* NOMURA and HATAI, *Bathygrca kyurokusimana* NOMURA and HATAI, *Chlamys vesiculosa* DUNKER, *Limopsis crenata* A. ADAMS, *Myadora fluctuosa* GOULD, *Ostrea musashiana* YOKOYAMA, *Paphia amabilis* PHILIPPI, *Pecten laqueatus* SOWERBY, *Pitar subpellucida* SOWERBY, *Poromya flexuosa* YOKOYAMA, *Sarepta speciosa* A. ADAMS, *Venericardia ferruginea* A. ADAMS, *Dentalium nivosum* KURODA and KIKUCHI, *Cavolina longirostris* LESSEUR, *Cylichna yamakawai* YOKOYAMA, *Enida japonica* A. ADAMS, *Fusinus nipponicus* SMITH, *Lienardia togetogen* n. sp., *Microfusus lischkei* KURODA, *Mitrella lischkei* SMITH, *Puncturella fastigiata* A. ADAMS, *Solariella peramabilis pseudobscura* YOKOYAMA, *Turcica imperialis* A. ADAMS, *Turritella fascialis* MENKE.

St. 8 (IIIW) :—*Aloides rotalis* HINDS, *Anomia cytaeum* GRAY,
Calopodium japanense NOMURA and HATAI, *Chlamys parirregularis* NOMURA and HATAI,
Chlamys squamata GMELIN, *Chlamys vesiculosa* DUNKER,
Hiatella arctica LINNÉ, *Limopsis crenata* A. ADAMS,
Myadora fluctuosa GOULD, *Nuculana gordonis* YOKOYAMA,
Pecten laqueatus SOWERBY, *Pitar subpellucida* SOWERBY,
Sarepta speciosa A. ADAMS, *Tellina* species indet.,
Tellina kurodai MAKIYAMA?, *Venericardia ferruginea* A. ADAMS,
Dentalium rhabdotum PILSBRY, *Cavolina longirostris* LESSEUR,
Enida japonica A. ADAMS, *Rhizorus tokunagai* MAKIYAMA,
Puncturella fastigiata A. ADAMS.

St. 9 (IIIW) :—*Hemipecten forbesianus* ADAMS and REEVE, *Limopsis crenata* A. ADAMS,
Limopsis multistriata FORSKÅL, *Myadora fluctuosa* GOULD,
Nuculana gordonis YOKOYAMA, *Pecten laqueatus* SOWERBY,
Dentalium corsucum PILSBRY, *Turritella fascialis* MENKE.

St. 10 (IIIW) :—*Macoma praetexta* v. MARTENS, *Macoma secta* CONRAD,
Macrocallista sinensis SOWERBY, *Mactra crossei* DUNKER,
Dentalium weinkauffi DUNKER, *Cavolina longirostris* LESSEUR,
Cerithium pfeiferi DUNKER, *Terebra lischkeana* DUNKER.

St. 11 (IIIW) :—*Tellina jedoensis* LISCHKE.

St. 12 (IIIW) :—*Cardium undatopictum* PILSBRY, *Macoma praetexta* v. MARTENS,
Macrocallista sinensis SOWERBY, *Olivella fulgurata* ADAMS and REEVE,

St. 14 (IIIW) :—*Codakia pisidium* DUNKER, *Cardium undatopictum* PILSBRY,
Chlamys squamosa GMELIN, *Limopsis crenata* A. ADAMS,
Limopsis multistriata FORSKÅL, *Macoma praetexta* v. MARTENS,
Nuculana gordonis YOKOYAMA, *Calliostoma aculeatum* SOWERBY,
Turritella fascialis MENKE.

St. 15 (IIIW) :—*Axinopsis viridis* DALL, *Glycymeris yessoensis* SOWERBY,
Limopsis multistriata FORSKÅL, *Macoma praetexta* v. MARTENS (?).

St. 16 (IIIW) :—*Macoma praetexta* v. MARTENS, *Macrocallista sinensis* SOWERBY,
Tellina jedoensis LISCHKE, *Dentalium weinkauffi* DUNKER,
Cavolina longirostris LESSEUR, *Nassarius dominulus* TAPPARONE-CANEFRI,
Polinices pila PILSBRY, *Turbonilla octopora* DALL and BARTSCH,
Turbonilla pseudapproximata NOMURA.

St. 18 (IIIW) :—*Limopsis multistriata* FORSKÅL, *Nuculana gordonis* YOKOYAMA,
Tellina miyatensis YOKOYAMA, *Turritella fascialis* MENKE,
Dentalium weinkauffi DUNKER.

St. 19 (IIIW) :—*Babylonia japonica* REEVE, *Strombus japonicus* REEVE,
Turris leucotropis ADAMS and REEVE.

St. 20 (IIIW) :—*Macrocallista sinensis* SOWERBY, *Pecten laqueatus* SOWERBY,
Turris leucotropis ADAMS and REEVE, *Nassarius gemmulatus* LAMARCK,
Terebra awajiensis PILSBRY.

St. 22 (IIIW) :—*Tellina jedoensis* LISCHKE, *Babylonia japonica* REEVE.

St. 23 (IIIW) :—*Macoma praetexta* v. MARTENS, *Pecten laqueatus* SOWERBY,

Tellina jedoensis Lischke, *Tellina nitidula* Dunker,
Tellina ovalis Sowerby, *Alvania etizenica* n. sp.,
Alvania wakasana n. sp., *Babylonia japonica* Reeve,
Turbonilla.

St. 34 (IIIW) :—*Glycymeris yessoensis* Sowerby.

Mollusca dredged by the Hukui-maru from Urasima-syô, off Hukui Prefecture in the year of 1937.

St. 1 (XIIU) :—*Chlamys nipponensis* Kuroda, *Glycymeris yessoensis* Sowerby,
Limopsis crenata A. Adams, *Limopss multistriata* Forskål,
Loripes ictericus Reeve, *Myadora fluctuosa* Gould,
Nuculana gordonis Yokoyama, *Ostrea musashiana* Yokoyama,
Ostrea rosacea Deshayes?, *Pecten laqueatus* Sowerby,
Dentalium corsucum Pilsbry (?), *Dentalium weinkauffi* Dunker,
Strombus japonicus Reeve.

St. 2 (XIIU) :—*Glycymeris yessoensis* Sowerby, *Limopsis crenata* A. Adams,
Limopsis multistriata Forskål, *Nuculana confusa* Hanley,
Paphia amabilis Philippi, *Pecten laqueatus* Sowerby,
Siphonalia cassidariaeformis Reeve.

St. 3 (XIIU) :—*Limopsis crenata* A. Adams, *Nucula tenuis* Montagu,
Nuculana gordonis Yokoyama, *Pecten laqueatus* Sowerby,
Dentalium species indet., *Turritella fascialis* Menke.

St. 4 (XIIU) :—*Aloides scaphoides* Hinds, *Aloides venustus* Gould,
Anomia cytaeum Gray, *Arca ocellata* Reeve,
Barbatia plicata Dillwyn, *Barbatia stearnsi* Pilsbry,
Barbatia symmetrica Reeve, *Cardita nodulosa* Lamarck,
Chama reflexa Reeve, *Chalmys parirregularis* Nomura and Hatai,
Joannisiella cumingi Hanley, *Hiatella arctica* Linné,
Lima lischkei Lamy, *Limopsis crenata* A. Adams,
Limopsis multistriata Forskål, *Pseudogrammatodon dalli* Smith,
Tellina jedoensis Lischke, *Venus toreuma* Gould,
Cantharidella callichroa Philippi, *Clanculus microdon ater* Pilsbry,
Collonista pilula Dunker, *Erato callosa* Adams and Reeve,
Homalopoma amusitatum Gould, *Homalopoma sangarense*
Schrenck,
Liotina semiclathratula Schrenck, *Mitrella varians* Dunker,
Monilea lifuana Fischer, *Nassarius* (?) species indet.,
Phos urasimensis n. sp., *Siliquaria cumingi* Mörch,
Triphora fusca Dunker.

St. 6 (XIIU) :—*Cardium samarangae* Makiyama, *Chlamys irregularis* Sowerby,
Chlamys vesiculosus Dunker, *Glycymeris yessoensis* Sowerby,
Limopsis crenata A. Adams, *Meiocardia tetragona* Adams and Reeve,
Nuculana gordonis Yokoyama, *Ostrea musashiana* Yokoyama,
Pecten laqueatus Sowerby, *Pitar subpellucida* Sowerby,
Pseudogrammatodon dalli Smith, *Venericardia ferruginea* A.
Adams,
Siphonalia spadicea Reeve.

St. 7 (XIIU) :—*Anomia cytaeum* Gray, *Cardita nodulosa* Lamarck,

Cardium eoa KURODA, *Chlamys parirregularis* NOMURA and HATAI, *Joannisiella cumingi* HANLEY, *Limopsis crenata* A. ADAMS, *Lima japonica* A. ADAMS, *Limopsis s-kinoshitai* KURODA, *Meiocardia ferruginea* A. ADAMS, *Ostrea rosacea* DESHAYES, *Venericardia ferruginea* A. ADAMS, *Argobuccinum oregonense* REDFIELD.

St. 10 (XIIU) :—*Arca ocellata* REEVE, *Cardium samarangae* MAKIYAMA, *Limopsis pelagica* SMITH, *Nuculana pernula* MÜLLER, *Volsella margaritacea* NOMURA and HATAI, *Bittium urasimanum* n. sp., *Dentalium rhabdotum* PILSBRY, *Turcicula crumpi* PILSBRY.

St. 11 (XIIU) :—*Chlamys vesiculosa* DUNKER, *Pitar subpellucida* SOWERBY, *Venericardia ferruginea* A. ADAMS, *Ocenebra adunca* SOWERBY, *Siphonalia spadicea* REEVE.

St. 12 (XIIU) :—*Astarte alaskensis* DALL, *Cardita nodulosa* LAMARCK, *Chlamys vesiculosa* DUNKER, *Crassatellites nanus* ADAMS and REEVE, *Lima japonica* A. ADAMS, *Limopsis crenata* A. ADAMS, *Pitar subpellucida* SOWERBY, *Pseudamusium intuscostatum tenuicostulatum* YOKOYAMA, *Pseudogrammatodon dalli* SMITH, *Sarepta speciosa* A. ADAMS, *Venericardia ferruginea* A. ADAMS, *Volsella margaritacea* NOMURA and HATAI, *Dentalium habutae* KURODA and KIKUCHI, *Cavolina longirostris* LESSEUR, *Puncturella nobilis* A. ADAMS.

St. 13 (XIIU) :—*Aloides venustus* GOULD, *Barbatia decussata* SOWERBY, *Barbatia plicata* DILLWYN, *Cardium undatopictum* PILSBRY, *Chama reflexa* REEVE, *Crassatellites nanus* ADAMS and REEVE, *Glycymeris pilsbryi* YOKOYAMA, *Limopsis crenata* A. ADAMS, *Limopsis multistriata* FORSKÅL, *Nuculana gordonis* YOKOYAMA, *Nuculana pernula* MÜLLER, *Nuculana yokoyamai* KURODA, *Pecten laqueatus* SOWERBY, *Pseudogrammatodon dalli* SMITH, *Dentalium yamakawai* YOKOYAMA, *Acmaea pygmaea* DUNKER, *Calliostoma haliarchum* MELVILL (juv.), *Cantharidella callichroa* PHILIPPI, *Cavolina longirostris* LESSEUR, *Erato callosa* ADAMS and REEVE.

St. 14 (XIIU) :—*Barbatia bistrigata* DUNKER, *Codakia pisidium* DUNKER, *Myadora fluctuosa* GOULD, *Venericardia ferruginea* A. ADAMS, *Eunaticina paphila* GMELIN.

St. 15 (XIIU) :—*Astarte borealis* SCHUMACHER, *Cardium samarangae* MAKIYAMA, *Chlamys vesiculosus* DUNKER, *Crassatellites nanus* ADAMS and REEVE, *Dosinia japonica* REEVE, *Glycymeris yessoensis* SOWERBY, *Limopsis crenata* A. ADAMS, *Limopsis pelagica* SMITH, *Natica* species indet. (operculum), *Nuculana yokoyamai* KURODA, *Pseudamusium intuscostatum tenuicostulatum* YOKOYAMA, *Siphonalia spadicea* REEVE, *Solen krusensterni* SCHRENCK?, *Tellina jedoensis* LISCHKE, *Dentalium habutae* KURODA and KIKUCHI.

St. 16 (XIIU) :—*Astarte borealis* SCHUMACHER.

St. 18(XIIU) :—*Chlamys vesiculosus* DUNKER, *Venericardia ferruginea* A. ADAMS, *Natica clausa* BRODERIP and SOWERBY, *Siphonalia spadicea* REEVE.

St. 19(XIIU) :—*Barbatia plicata* DILLWYN, *Cardita nodulosa* LAMARCK, *Cardium samarangae* MAKIYAMA, *Chlamys parirregularis* NOMURA and HATAI, *Chlamys vesiculosus* DUNKER, *Crassatellites nanus* ADAMS and REEVE, *Glycymeris yessoensis* SOWERBY, *Hiatella arctica* LINNÉ, *Limopsis multistriata* FORSKÅL, *Ostrea musashiana* YOKOYAMA, *Pitar subpellucida* SOWERBY, *Pseudogrammatodon dalli* SMITH, *Venericardia ferruginea* A. ADAMS, *Dentalium weinkauffi* DUNKER, *Siphonalia stearnsi* PILSBRY.

St. 20(XIIU) :—*Limopsis azumana* YOKOYAMA, *Limopsis pelagica* SMITH, *Nuculana pernula* MÜLLER, *Dentalium rhabdotum* PILSBRY, *Trachyrhynchus* species indet., *Turcicula crumpi* PILSBRY, *Turritella tibana* NOMURA.

St. 21(XIIU) :—*Dentalium crocinum* DALL?.

St. 23(XIIU) :—*Limopsis pelagica* SMITH, *Volsella margaritacea* NOMURA and HATAI, *Dentalium rhabdotum* PILSBRY.

St. 24(XIIU) :—*Glycymeris yessoensis* SOWERBY, *Limopsis pelagica* SMITH, *Myadora fluctuosa* GOULD, *Dentalium rhabdotum* PILSBRY.

St. 25(XIIU) :—*Anodontia bialata* PILSBRY, *Cardium samarangae* MAKIYAMA, *Chlamys vesiculosus* DUNKER, *Glycymeris yessoensis* SOWERBY, *Limopsis crenata* A. ADAMS, *Myadora fluctuosa* GOULD, *Paphia amabilis* PHILIPPI?, *Pitar subpellucida* SOWERBY, *Dentalium habutae* KURODA and KIKUCHI, *Fusinus simplex* SMITH, *Searlesia* species indet., *Siphonalia spadicea* REEVE.

St. 26(XIIU) :—*Limopsis crenata* A. ADAMS, *Ostrea rosacea* DESHAYES, *Paphia amabilis* PHILIPPI, *Pecten laqueatus* SOWERBY, *Pitar subpellucida* SOWERBY, *Sanguinolaria olivacea* JAY?, *Sarepta speciosa* A. ADAMS, *Venericardia ferruginea* A. ADAMS.

St. 27(XIIU) :—*Joannisiella cumingi* HANLEY.

St. 28(XIIU) :—*Crassatellites nanus* ADAMS and REEVE, *Pecten laqueatus* SOWERBY, *Dentalium tibanum* NOMURA(MS), *Nassarius gemmulatus* LAMARCK, *Polinices didymus* BOLTEN, *Strombus japonicus* REEVE, *Umbonium moniliferum costatum* KIENER.

St. 29(XIIU) :—*Limopsis crenata* A. ADAMS.

St. 32(XIIU) :—*Glycymeris yessoensis* SOWERBY.

St. 33(XIIU) :—*Tellina consanguinea* SOWERBY, *Cerithium kochi* PHILIPPI.

St. 34(XIIU) :—*Cardium undatopictum* PILSBRY, *Cerithium kochi* PHILIPPI.

St. 36(XIIU) :—*Cardium bulowi* ROLLE, *Cardium samarangae* MAKIYAMA, *Glycymeris yessoensis* LISCHKE, *Limopsis crenata* A. ADAMS, *Myadora fluctuosa* GOULD, *Nuculana gordonis* YOKOYAMA, *Pecten laqueatus* SOWERBY, *Dentalium corsucum* PILSBRY, *Dentalium crocinum* DALL.

St. 38(XIIU) :—*Lima quantoensis* YOKOYAMA, *Pitar subpellucida* SOWERBY.

St. 39(XIIU) :—*Calopodium japanense* NOMURA and HATAI, *Cardium samarangae* MAKIYAMA, *Chione tayaensis* NOMURA and HATAI?, *Chlamys vesiculosa* DUNKER,

Lima japonica A. Adams, *Lima lima* Linné,
Limopsis crenata A. Adams, *Myadora fluctuosa* Gould,
Nucula tenuis Montagu, *Pecten laqueatus* Sowerby,
Pitar subpellucida Sowerby, *Pododesmus radiatus* Sowerby,
Sarepta speciosa A. Adams, *Spondylus cruentus* Lischke,
Venericardia ferruginea A. Adams, *Volsella modiola* Linné,
Dentalium habutae Kuroda and Kikuchi, *Dentalium nivosum* Kuroda and Kikuchi,
Dentalium rhabdotum Pilsbry, *Cavolina uncinata* Rang,
Microfusus lischkei Smith, *Mitrella lischkei* Smith,
Nassarius caelatus A. Adams, *Puncturella fastigiata* A. Adams.

St. 41(XIIU) :—*Acila divaricata* Hinds, *Glycymeris yessoensis* Sowerby.

St. 45(XIIU) :—*Arca ocellata* Reeve, *Cardita nodulosa* Lamarck,
Cardium samarangae Makiyama, *Chlamys parirregularis* Nomura and Hatai,
Hiatella arctica Linné, *Jouannetia globosa* Quoy and Gaimard,
Lima goliath Smith, *Ostrea musashiana* Yokoyama,
Pseudamusium intuscostatum tenuicostulatum Yokoyama,
Pseudogrammatodon dalli Smith, *Dentalium crocinum* Dall?,
Turcicula crumpi Pilsbry.

St. 46(XIIU) :—*Chlamys parirregularis* Nomura and Hatai, *Ostrea musashiana* Yokoyama,
Emarginula foveolata Sowerby.

St. 47(XIIU) :—*Dentalium rhabdotum* Pilsbry.

Mollusca dredged by the Hukui-maru from Gentatu-se, off Hukui Prefecture.

St. 231(HG) :—*Pitar hukaurensis* Nomura and Hatai.

St. 383(HG) :—*Pitar subpellucida* Sowerby, *Venericardia ferruginea* A. Adams.

St. 384(HG) :—*Volsella margaritacea* Nomura and Hatai.

St. 385(HG) :—*Venus faveolata* Sowerby.

St. 387(HG) :—*Limopsis crenata* A. Adams, *Myadora fluctuosa* Gould,
Sarepta speciosa A. Adams, *Dentalium habutae* Kuroda and Kikuchi,
Dentalium nivosum Kuroda and Kikuchi.

St. 388(HG) :—*Hemipecten forbesianus* Adams and Reeve?, *Sarepta speciosa* A. Adams,
Cylichna sibaénsis Yamakawa.

St. 392(HG) :—*Limopsis crenata* A. Adams, *Dentalium* species indet.

St. 583(HG).—*Volsella margaritacea* Nomura and Hatai,

St. 536(HG) :—*Glycymeris yessoensis* Sowerby.

St. 545(HG) :—*Aloides substriatus* Yokoyama, *Cardium bülowi* Rolle,
Cuspidaria chinensis Griffith and Pidgeon (?),
Limopsis crenata A. Adams.

St. 547(HG) :—*Venericardia ferruginea* A. Adams.

St. 568(HG) :—*Limopsis crenata* A. Adams, *Pododesmus radiatus* Sowerby,
Sarepta speciosa A. Adams, *Taras cumingi* Hanley,
Venericardia ferruginea A. Adams.

St. 579(HG) :—*Dentalium corsucum* Pilsbry (?), *Dentalium rhabdotum* Pilsbry.

St. 582(HG) :—*Cardium eoa* Kuroda, *Limopsis crenata* A. Adams, *Venericardia ferruginea* A. Adams.
St. 589(HG) :—*Cardium bülowi* Rolle, *Limopsis crenata* A. Adams, *Nuculana yokoyamai* Kuroda, *Lora suturalineata* Nomura and Hatai.
St. 594(HG) :—*Limopsis crenata* A. Adams, *Ostrea musashiana* Yokoyama.
St. 625(HG) :—*Limopsis crenata* A. Adams.
St. 629(HG) :—*Pitar hukaurensis* Nomura and Hatai, *Sarepta speciosa* A. Adams.
St. 634(HG) :—*Limopsis crenata* A. Adams, *Venericardia ferruginea* A. Adams.
St. 656(HG) :—*Limopsis pelagica* Smith, *Macoma calcarea* Gmelin?.
St. 681(HG) :—*Trophon xestra* Dall?.
St. 682(HG) :—*Hemipecten forbesianus* Adams and Reeve?.
St. 688(HG) :—*Arca ocellata* A. Adams, *Limopsis crenata* A. Adams, *Venericardia ferruginea* A. Adams.
St. 691(HG) :—*Aloides substriatus* Yokoyama.
St. 692(HG) :—*Ostrea musashiana* Yokoyama, *Venericardia ferruginea* A. Adams.
St. 693(HG) :—*Chlamys vesiculosa* Dunker, *Hiatella arctica* Linné, *Limopsis crenata* A. Adams, *Ostrea musashiana* Yokoyama, *Pitar subpellucida* Sowerby, *Sarepta speciosa* A. Adams, *Venericardia ferruginea* A. Adams, *Phos urasimensis* n. sp.
St. 694(HG) :—*Limopsis crenata* A. Adams, *Pitar subpellucoda* Sowerby, *Pseudamusium intuscostatum tenuicostulatum* Yokoyama.
St. 695(HG) :—*Aloides substriatus* Yokoyama, *Sarepta speciosa* A. Adams.
St. 696(HG) :—*Limopsis crenata* A. Adams, *Sarepta speciosa* A. Adams, *Hyalina perovulum* Yokoyama.
St. 701(HG) :—*Sarepta speciosa* A. Adams.
St. 702(HG) :—*Limopsis crenata* A. Adams, *Myadora fluctuosa* Gould, *Sarepta speciosa* A. Adams, *Venericardia ferruginea* A. Adams.
St. 710(HG) :—*Limopsis pelagica* Smith.
St. 740(HG) :—*Hyalina perovulum* Yokoyama, *Limopsis crenata* A. Adams.
St. 775(HG) :—*Glycymeris yessoensis* Sowerby, *Lioconcha gordonis* Yokoyama.
St. 779(HG) :—*Myadora fluctuosa* Gould, *Volsella margaritacea* Nomura and Hatai.
St. 780(HG) :—*Dentalium rhabdotum* Pilsbry.
St. 786(HG) :—*Limopsis crenata* A. Adams, *Venericardia ferruginea* A. Adams.
St. 792(HG) :—*Limopsis crenata* A. Adams, *Ostrea musashiana* Yokoyama, *Cavolina longirostris* Lesueur, *Fusinus perplexus* A. Adams, *Lora* species indet.
St. 807(HG) :—*Cardita nodulosa* Lamarck, *Limopsis azumana* Yokoyama, *Limopsis crenata* A. Adams, *Limopsis pelagica* Smith, *Ostrea musashiana* Yokoyama.
St. 812(HG) :—*Limopsis crenata* A. Adams, *Volsella margaritacea* Nomura and Hatai.
St. 815(HG) :—*Limopsis crenata* A. Adams.
St. 817(HG) :—*Limopsis crenata* A. Adams, *Macrocallista sinensis* Sowerby.
St. 821(HG) :—*Limopsis creanta* A. Adams, *Limopsis multistriata* Forskål.
St. 822(HG) :—*Pitar hukaurensis* Nomura and Hatai, *Sarepta speciosa* A. Adams.
St. 877(HG) :—*Volsella margaritacea* Nomura and Hatai.
St. 898(HG) :—*Hyalina perovulum* Yokoyama.
St. 940(HG) :—*Dentalium buccinulum* Gould (?), *Cavolina longirostris* Lesueur.

St. 947 (HG) :—*Limopsis crenata* A. Adams.
St. 954 (HG) :—*Limopsis multistriata* Forskål.
St. 955 (HG) :—*Limopsis multistriata* Forskål.
St. 963 (HG) :—*Chione mindanensis* Yokoyama, *Lioconcha gordonis* Yokoyama.
St. 1040 (HG) :—*Limopsis crenata* A. Adams, *Limopsis multistriata* Forskål.
St. 1054 (HG) :—*Paphia amabilis* Philippi, *Siphonodentalium ozawai* Yokoyama.
St. 1076 (HG) :—*Limopsis crenata* A. Adams.
St. 1105 (HG) :—*Limopsis multistriata* Forskål.

Mollusca dredged by the Syôwa-maru of the Kyôto Fisheries Institute from Urasimasyô, off Hukui Prefecture.

St. 1 (KU) :—*Limopsis pelagica* Smith, *Ostrea musashiana* Yokoyama, *Argobuccinum oregonense* Redfield, *Turcicula crumpii* Pilsbry.
St. 2 (KU) :—*Cardita nodulosa* Lamarck, *Chlamys vesiculosus* Dunker, *Hiatella arctica* Linné, *Lima japonica* A. Adams, *Pseudamusium intuscostatum tenuicostulatum* Yokoyama, *Venericardia ferruginea* A. Adams, *Homalopoma sangarense* Schrenck.
St. 3 (KU) :—*Acila divaricata* Hinds, *Limopsis crenata* A. Adams.
St. 4 (KU) :—*Acila divaricata* Hinds, *Dentalium toyamense* Kuroda and Kikuchi.
St. 7 (KU) :—*Chlamys parirregularis* Nomura and Hatai, *Hiatella arctica* Linné. "*Jouannetia*" *yabei* Yokoyama, *Limopsis crenata* A. Adams, *Myadora fluctuosa* Gould, *Ostrea rosacea* Deshayes, *Pododesmus radiatus* Sowerby, *Pseudogrammatodon dalli* Smith.
St. 10 (KU) :—*Calopodium japanense* Nomura and Hatai, *Cardita nodulosa* Lamarck, *Cardium samarangae* Makiyama, *Chlamys vesiculosus* Dunker, *Limopsis crenata* A. Adams, *Pseudamusium intuscostatum tenuicostatulatum* Yokoyama, *Sarepta speciosa* A. Adams, *Venericardia ferruginea* A. Adams, *Cyclostrema cinguliferum* A. Adams, *Homalopoma amusitatum* Gould, *Puncturella nobilis* A. Adams.

List of Species

I. PELECYPODA

Nuculidae

Acila divaricata Hinds

St. 17 (IIW), Reg. No. 20108; faded valves. St. 51 (IIW), Reg. No. 20377; fresh valves. St. 2 (IIIW), Reg. No. 20419; faded valve. St. 43 (XIIU), Reg. No. 20890; fresh valves. St. 3 (KU), Reg. No. 21041; fresh valves. St. 4 (KU), Reg. No. 21042; fresh and faded valves.

Nucula tenuis Montagu

St. 3 (XIIU), Reg. No. 20662; faded valves. St. 39 (XIIU), Reg. No. 20879; faded valve.

Nuculanidae

Nuculana gordonis Yokoyama

St. 2 (IIIW), Reg. No. 20417; faded valves. St. 8 (IIIW), Reg. No. 20504; faded valves. St. 9 (IIIW), Reg. No. 20507; faded valve. St. 14 (IIIW), Reg. No. 20533; faded valve. St. 18 (IIIW), Reg. No. 20552; fresh valves. St. 1 (XIIU), Reg. No. 20638; fresh valves. St. 2 (XIIU), Reg. No. 20649; fresh valves. St. 3 (XIIU), Reg. No. 20657; fresh valves. St. 6 (XIIU), Reg. No. 20698; fresh valve. St. 36 (XIIU), Reg. No. 20858; fresh valves. St. 13 (XIIU), Reg. No. 21884; fresh valve.

Nuculana pernula Müller

St. 10 (XIIU), Reg. No. 20720; fresh valve. St. 13 (XIIU), Reg. No. 21885; fresh valves. St. 20 (XIIU), Reg. No. 20808; fresh valve.

Nuculana yokoyamai Kuroda

St. 16 (IIW), Reg. No. 20111; faded valve. St. 34 (IIW), Reg. No. 20272; faded valve. St. 13 (XIIU), Reg. No. 20748; fresh valves. St. 15 (XIIU), Reg. No. 20783; faded valve. St. 589 (HG), Reg. No. 20992; faded valve.

Sarepta speciosa A. Adams

St. 5 (IIIW), Reg. No. 20437; fresh and faded valves. St. 6 (IIIW), Reg. No. 20446; fresh valves. St. 7 (IIIW), Reg. No. 20482; faded valves. St. 8 (IIIW), Reg. No. 20488; faded valve. St. 12 (XIIU), Reg. No. 20740; fresh valves. St. 26 (XIIU), Reg. No. 20839; faded valve. St. 39 (XIIU), Reg. No. 20874; faded valve. St. 387 (HG), Reg. No. 20961; faded valve. St. 388 (HG), Reg. No. 20966; faded valve. St. 568 (HG), Reg. No. 20982; faded valves. St. 629 (HG), Reg. No. 20996; faded valve. St. 693 (HG), Reg. No. 21016; fresh valves. St. 695 (HG), Reg. No. 21022; faded valve. St. 696 (HG), Reg. No. 21023; faded valves. St. 701 (HG), Reg. No. 21026; faded valve. St. 702 (HG), Reg. No. 20912; faded valves. St. 822 (HG), Reg. No. 20943; faded valve. St. 10 (KU), Reg. No. 21057; fresh valves.

Arcidae

Arca boucardi Jousseaume

St. 34 (IIW), Reg. No. 20279; faded valve.

Arca ocellata Reeve

St. 3 (IW), Reg. No. 21082; fresh valves. St. 5 (IW), Reg. No. 21096; faded valve. St. 6 (IW), Reg. No. 21120; fresh and faded valves. St. 9 (IW), Reg. No. 21151; fresh valves. St. 14 (IW), Reg. No. 21207; small, faded valve. St. 21 (IIW), Reg. No. 20146; faded valves. St. 26 (IIW), Reg. No. 20191; fresh and faded valves. St. 38 (IIW), Reg. No. 20298; fresh valve. St. 40 (IIW), Reg. No. 20323; faded valve. St. 45 (XIIU), Reg. No. 20892; fresh valves. St. 60 (XIIU), Reg. No. 20722; faded valve. St. 4 (XIIU), Reg. No. 20675; fragmental valve. St. 688 (HG), Reg. No. 21004; small, faded valve.

Barbatia bistrigata Dunker

St. 7 (IIIW), Reg. No. 20485; faded valve. St. 14 (XIIU), Reg. No. 20766; faded valve.

Barbatia decussata Sowerby

St. 13 (XIIU), Reg. No. 20753; small faded valves.

Barbatia plicata Dillwyn

St. 5 (IW), Reg. No. 21094; fresh and faded valves. St. 9 (IW), Reg. No. 21903, faded valve. St. 14 (IW), Reg. No. 21208; faded valve. St. 26 (IIW), Reg. No. 20197; faded valve. St. 28 (IIW), Reg. No. 20228; faded valves. St. 29 (IIW), Reg. No. 20239; faded valve. St. 32 (IIW), Reg. No. 20257; fresh valves. St. 4 (XIIU), Reg. No. 20672; faded valves. St. 13 (XIIU), Reg. No. 20754; faded valves. St. 19 (XIIU), Reg. No. 20796; fresh valve.

Barbatia stearnsi Pilsbry

St. 5 (IW), Reg. No. 21089; faded valve. St. 4 (XIIU), Reg. No. 20676; fresh valves.

Barbatia symmetrica Reeve

St. 26 (IIW), Reg. No. 20199; faded valve. St. 29 (IIW), Reg. No. 20241; faded valve. St. 4 (XIIU), Reg. No. 20667; fresh valve.

Bathyarca kyurokusimana Nomura and Hatai

St. 7 (IIIW), Reg. No. 20484; faded valve.

Anadara troscheli DUNKER

St. 21 (IIW), Reg. No. 20144; fresh valves.

Pseudogrammatodon dalli SMITH[1].

St. 6 (IW), Reg. No. 21108; fresh and faded valves. St. 7 (IW), Reg. No. 21130; faded valve. St. 9 (IW), Reg. No. 21152; fresh and faded valves. St. 7 (IIW), Reg. No. 20093; faded valves. St. 20 (IIW), Reg. No. 20134; faded valve. St. 21 (IIW), Reg. No. 20152; fresh valves. St. 26 (IIW), Reg. No. 20203; small, faded valves. St. 28 (IIW), Reg. No. 20226; fresh and faded valves. St. 33 (IIW), Reg. No. 20266; faded valves. St. 34 (IIW), Reg. No. 20275; faded valves. St. 38 (IIW), Reg. No. 20294; fresh valves. St. 39 (IIW), Reg. No. 20306, faded valves. St. 40 (IIW), Reg. Nos. 20316, 20322; faded valves. St. 41 (IIW), Reg. No. 20331; fresh valves. St. 4 (XIIU), Reg. No. 20679; small, fresh valve. St. 7 (XIIU), Reg. No. 20703, faded valve. St. 12 (XIIU), Reg. No. 20736; faded valves. St. 13 (XIIU), Reg. No. 20755; small, faded valve. St. 19 (XIIU), Reg. No. 20798; faded valves. St. 45 (XIIU), Reg. No. 20897; faded valve. St. 7 (KU), Reg. No. 21046; faded valve.

Paragrammatodon[2] *pacificus* NOMURA and ZINBÔ

St. 7 (IIW), Reg. No. 20089; faded valve. St. 26 (IIW), Reg. No. 20188; faded valves.

Glycymeridae

Glycymeris pilsbryi YOKOYAMA

St. 3 (IW), Reg. No. 21086, faded valve. St. 5 (IW), Reg. No. 21088; fresh and faded valves. St. 6 (IW), Reg. No. 21121; faded valves. St. 9 (IW), Reg. No. 21155; fresh valve. St. 12 (IW), Reg. No. 21178; faded valve. St. 13 (IW), Reg. No. 21184; fresh and faded

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1) Minute serration or crenulatum of the posterior teeth which are parallel to the hinge line is sufficient to separate the genus from other arcid genera.

1) The new genus *Paragrammatodon* which is here proposed differs from *Pseudogrammatodon* (type.—"*Arca* (*Macrodon*)" *dalli* SMITH) by having no serrate posterior teeth and prominent concentric undulations or ridges upon the surface. The type of *Pseudogrammatodon* has many distinct radial ribs like *Barbatia*, but in *Paragrammatodon*, the radials are very weak and many, or in part being obsoleted. The type species of *Paragrammatodon* is "*Pseudogrammatodon*" *pacificus* NOMURA and ZINBÔ (Sci. Rep., Tôhoku Imp. Univ., ser. 2, no. 16, p. 153, pl. 5, figs. 6a, 6b, 1934).

valves. St. 14 (IW), Reg. No. 21212; fresh and faded valves. St. 19 (IIW), Reg. No. 20123; fresh and faded valves. St. 20 (IIW), Reg. No. 20137; fresh and faded valves. St. 26 (IIW), Reg. No. 20186; fresh and faded valves. St. 28 (IIW), Reg. No. 20235; fresh valves. St. 53 (IIW), Reg. No. 20394; faded valves. St. 13 (XIIU), Reg. No. 20756; faded valves.

Glycymeris yessoensis Sowerby

St. 16 (IIW), Reg. No. 20104; fresh and faded small valves. St. 34 (IIW), Reg. No. 20273; faded valves. St. 39 (IIW), Reg. No. 20305; faded valves. St. 53 (IIW), Reg. No. 20383; faded, small valve. St. 2 (IIIW), Reg. No. 20421; faded, small valve. St. 6 (IIIW), Reg. No. 20447; fresh and faded valves. St. 15 (IIIW), Reg. No. 20539; small faded valve. St. 34 (IIIW), Reg. No. 20575; small fresh valve. St. 1 (XIIU), Reg. No. 20642; small fresh valve. St. 2 (XIIU), Reg. No. 20653; small fresh valve. St. 6 (XIIU), Reg. No. 20697; small faded valves. St. 15 (XIIU), Reg. No. 20775; fresh valves. St. 19 (XIIU), Reg. No. 20804; faded valves. St. 24 (XIIU), Reg. No. 20818; small fresh valves. St. 25 (XIIU), Reg. Nos. 20823, 20827; fresh and faded valves. St. 32 (XIIU), Reg. No. 20850; small faded valve. St. 36 (XIIU), Reg. No. 20869; fresh valves. St. 41 (XIIU), Reg. No. 20859; fresh valve. St. 536 (HG), Reg. No. 20972; small faded valves. St. 775 (HG), Reg. No. 20918; small faded valves.

Limopsidae

Limopsis azumana Yokoyama

St. 41 (IIW), Reg. No. 20333, faded valve. St. 20 (XIIU), Reg. No. 20807, faded valve. St. 807 (HG), Reg. No. 21894; faded valve.

Limopsis crenata A. Adams

St. 11 (IW), Reg. No. 21171; faded valves. St. 7 (IIW), Reg. No. 20092; fresh valves. St. 16 (IIW), Reg. No. 20102; faded valves. St. 21 (IIW), Reg. No. 20153; fresh valve. St. 29 (IIW), Reg. No. 20242; fresh and faded valves. St. 34 (IIW), Reg. No. 20277; faded valve. St. 40 (IIW), Reg. No. 20320; fresh valve. St. 46 (IIW), Reg. No. 20356; faded valve. St. 48 (IIW), Reg. No. 20367; fresh valves. St. 53 (IIW), Reg. Nos. 20391, 21895; faded valves. St. 2 (IIIW), Reg. No. 20414; faded valves. St. 4 (IIIW), Reg. No. 20431; faded valves. St. 6 (IIIW), Reg. No. 20445; faded valve. St. 7

(IIIW), Reg. Nos. 20461, 20481; fresh and faded valves. St. 8 (IIIW), Reg. No. 20503; faded valves. St. 9 (IIIW), Reg. No. 20510; faded valves. St. 14 (IIIW), Reg. No. 20532; faded valves. St. 547 (HG), Reg. No. 20977; faded valves. St. 1 (XIIU), Reg. No. 20640; fresh valves. St. 2 (XIIU), Reg. No. 20654; fresh and faded valves. St. 3 (XIIU), Reg. No. 20660; faded valves. St. 4 (XIIU), Reg. No. 20665; fresh valve. St. 7′ (XIIU), Reg. No. 20707; fresh and faded valves. St. 12 (XIIU), Reg. No. 20733; faded valve. St. 13 (XIIU), Reg. No. 20747; fresh and faded valves. St. 15 (XIIU), Reg. No. 20786; fresh and faded valves. St. 25 (XIIU), Reg. No. 20821; fresh valve. St. 26 (XIIU), Reg. No. 20834; faded valves. St. 29 (XIIU), Reg. No. 20849; faded valves. St. 36 (XIIU), Reg. No. 20857; faded valves. St. 39 (XIIU), Reg. No. 20875; faded valves. St. 387 (HG), Reg. No. 20963; faded valves. St. 392 (HG), Reg. No. 20968; faded valves. St. 545 (HG), Reg. No. 20976; faded valves. St. 568 (HG), Reg. No. 20979; fresh and faded valves. St. 582 (HG), Reg. No. 20987; faded valves. St. 589 (HG), Reg. No. 20990; faded valves. St. 625 (HG), Reg. No. 20995; faded valves. St. 634 (HG), Reg. No. 20999; faded valve. St. 688 (HG), Reg. No. 21005; faded valves. St. 693 (HG), Reg. No. 21012; fresh valves. St. 694 (HG), Reg. No. 21020; faded valve. St. 696 (HG), Reg. No. 21025; faded valve. St. 702 (HG), Reg. No. 20913; faded valve. St. 740 (HG), Reg. No. 20916; faded valves. St. 786 (HG), Reg. No. 20922; faded valves. St. 792 (HG), Reg. No. 20924; faded valves. St. 807 (HG), Reg. No. 20931; faded valves. St. 812 (HG), Reg. No. 20933; faded valves. St. 815 (HG), Reg. No. 20935; faded valve. St. 817 (HG), Reg. No. 20936; faded valve. St. 821 (HG), Reg. No. 20938; faded valves. St. 947 (HG), Reg. No. 20946; faded valve. St. 1076 (HG), Reg. No. 20954; faded valves. St. 1040 (HG), Reg. No. 20950; faded valves. St. 3 (KU), Reg. No. 21040; faded valve. St. 7 (KU), Reg. No. 21050; faded valve. St. 10 (KU), Reg. No. 21054; faded valve.

Limopsis multistriata Forskål

St. 2 (IIIW), Reg. No. 20420; fresh valves. St. 9 (IIIW), Reg. No. 20511; fresh valve. St. 14 (IIIW), Reg. No. 20531; fresh valve. St. 15 (IIIW), Reg. No. 20537; fresh valves. St. 18 (IIIW), Reg. No. 20553; fresh valves. St. 1 (XIIU), Reg. No. 20637; fresh valves. St. 2 (XIIU), Reg. No. 20648; faded valve. St. 4 (XIIU), Reg. No. 20667; faded valve. St. 13 (XIIU), Reg. Nos. 20749, 21881; fresh valves.

St. 19 (XIIU), Reg. No. 20803; faded valve. St. 821 (HG), Reg. No. 20939; faded valve. St. 954 (HG), Reg. No. 20947; faded valve. St. 955 (HG), Reg. No. 20948; faded valves. St. 1040 (HG), Reg. No. 20951; fresh valve. St. 1105 (HG), Reg. No. 20955; faded valves.

Limopsis pelagica SMITH

St. 11 (IW), Reg. No. 21168; faded valves. St. 22 (IIW), Reg. No. 20178; fresh and faded valves. St. 36 (IIW), Reg. No. 20285; faded valve. St. 49 (IIW), Reg. No. 20376; fresh and faded valves. St. 53 (IIW), Reg. No. 21877; fresh valve. St. 54 (IIW), Reg. No. 20407; fresh valves. St. 10 (XIIU), Reg. No. 20719; fresh and faded valves. St. 15 (XIIU), Reg. No. 20782; fresh valves. St. 20 (XIIU), Reg. No. 20809; faded valves. St. 23 (XIIU), Reg. No. 20815; fresh valves. St. 24 (XIIU), Reg. No. 20817; fresh valves. St. 656 (HG), Reg. No. 21001; faded valve. St. 710 (HG), Reg. No. 20914; fresh and faded valves. St. 807 (HG), Reg. No. 20930; fresh valve. St. 1 (KU), Reg. No. 21028; faded valves.

Limopsis s-kinoshitai KURODA

St. 1 (IW), Reg. No. 21065; fresh valve. St. 13 (IW), Reg. No. 21188; faded valve. St. 21 (IIW), Reg. No. 20141; fresh and faded valves. St. 41 (IIW), Reg. No. 20330; faded valve. St. 7′ (XIIU), Reg. No. 20709; faded valve.

Mytilidae

Volsella margaritacea NOMURA and HATAI

St. 8 (IW), Reg. No. 21146; fresh valves. St. 10 (XIIU), Reg. No. 20718; fresh valves. St. 12 (XIIU), Reg. No. 20732; fragmental valve. St. 23 (XIIU), Reg. No. 20814. St. 39 (XIIU), Reg. No. 20871; fresh and faded valves. St. 384 (HG), Reg. No. 20960; small, faded valve. St. 533 (HG), Reg. No. 20970; small, faded valve. St. 779 (HG), Reg. No. 20920; small, faded valves. St. 812 (HG), Reg. No. 20934; fragmental valve. St. 877 (HG), Reg. No. 20942; faded valve. St. 10 (KU), Reg. No. 21052; fresh valves.

Volsella modiola LINNÉ?

St. 3 (IIIW), Reg. No. 20427; fragmental valve. St. 3 (XIIU), Reg. No. 20659; fragmental valve. St. 39 (XIIU), Reg. No. 20871; fragmental valve.

Plicatula horrida Dunker

St. 4 (XIIU), Reg. No. 21906; faded valve.

Plicatula simplex Gould

St. 19 (IIW), Reg. No. 20125; fresh valves.

Pecten laqueatus Sowerby

St. 19 (IIW), Reg. No. 20154; faded valve. St. 53 (IIW), Reg. No. 20381; fresh and faded valves. St. 2 (IIIW), Reg. No. 20415; small, faded valve. St. 7 (IIIW), Reg. No. 20483; fragmental valve. St. 8 (IIIW), Reg. No. 20490; small, faded valves. St. 9 (IIIW), Reg. No. 20509; small, faded valves. St. 20 (IIIW), Reg. No. 20560; small, fresh valve. St. 23 (IIIW), Reg. No. 20567; small, fresh valves. St. 1 (XIIU), Reg. No. 20643; fragmental valve. St. 2 (XIIU), Reg. No. 20651; fragmental valve. St. 3 (XIIU), Reg. No. 20658; small, faded valves. St. 6 (XIIU), Reg. No. 20696; fragmental valve. St. 13 (XIIU), Reg. No. 20758; fresh and faded valves. St. 26 (XIIU), Reg. No. 20835; fragmental valve. St. 28 (XIIU), Reg. No. 20843; small, fresh valve. St. 36 (XIIU), Reg. No. 20856; fragmental valve. St. 39 (XIIU), Reg. No. 20868; faded valves.

Chlamys irregularis Sowerby

St. 3 (IW), Reg. No. 21081; faded valve. St. 7 (IW), Reg. No. 21129; faded valves. St. 14 (IW), Reg. No. 21200, faded valves. St. 19 (IIW), Reg. No. 20129; fresh valve. St. 20 (IIW), Reg. No. 20130; fresh valve. St. 28 (IIW), Reg. No. 20193; faded valve. St. 8 (IIIW), Reg. No. 20502; faded valve. St. 4 (XIIU), Reg. No. 20772; fresh valves.

Chlamys nipponensis Kuroda

St. 7 (IW), Reg. No. 21883; small, fresh valve. St. 1 (XIIU), Reg. No. 20644; small, faded valve.

Chlamys parirregularis Nomura and Hatai

St. 2 (IW), Reg. No. 21069; fresh and faded valves. St. 6 (IW), Reg. No. 21117; fresh and faded valves. St. 7 (IW), Reg. No. 21129; faded valves. St. 8 (IW), Reg. No. 21138; faded valves. St. 9 (IW), Reg. No. 21156; fresh and faded valves. St. 12 (IW), Reg. No. 21181; faded valves. St. 13 (IW), Reg. No. 21191; fresh and faded valves. St. 7 (IIW), Reg. No. 20095; 21876; fresh and faded valves. St. 20

(IIW), Reg. No. 21907; faded valve. St. 21 (IIW), Reg. No. 20163; fresh and faded valves. St. 22 (IIW), Reg. No. 20173; jointed valves. St. 29 (IIW), Reg. No. 20247; fresh valve. St. 38 (IIW), Reg. No. 20289; fresh and faded valves. St. 39 (IIW), Reg. No. 20302; faded valve. St. 40 (IIW), Reg. No. 20311; faded valves. St. 41 (IIW), Reg. No. 20329; faded valves. St. 44 (IIW), Reg. No. 20341; jointed valves. St. 47 (IIW), Reg. No. 20365; jointed valves. St. 48 (IIW), Reg. No. 20368; faded valves. St. 4 (XIIU), Reg .No. 20772; faded valves. St. 7 (XIIU), Reg. No. 20700; faded valves. St. 19 (XIIU), Reg. No. 20802; fresh valves. St. 45 (XIIU), Reg. No. 20895; faded valve. St. 46 (XIIU), Reg. No. 20903; faded valve. St. 7 (KU), Reg. No. 21047; faded valve.

Chlamys squamata Gmelin

St. 53 (IIW), Reg. No. 20382; small, faded valves. St. 8 (IIIW), Reg. No. 21891; small, fresh valve.

Chlamys vesiculosa Dunker

St. 1 (IW), Reg. No. 21066; faded valve. St. 3 (IW), Reg. No. 21083; fresh and faded valves. St. 5 (IW), Reg. No. 21093; faded valves. St. 6 (IW), Reg. No. 21106; fresh and faded valves. St. 7 (IW), Reg. No. 21131; faded valves. St. 8 (IW), Reg. No. 21141; fresh and faded valves. St. 9 (IW), Reg. No. 21153; fresh valves. St. 10 (IW), Reg. No. 21162; fresh valve. St. 12 (IW), Reg. No. 21176; fresh valve. St. 13 (IW), Reg. No. 21185; fresh and faded valves. St. 14 (IW), Reg. No. 21211; fresh and faded valves. St. 7 (IIW), Reg. No. 20090; fresh and faded valves. St. 19 (IIW), Reg. No. 20117; faded valves. St. 20 (IIW), Reg. No. 20158; faded valves. St. 21 (IIW), Reg. No. 20145; faded valves. St. 26 (IIW), Reg. No. 20187; fresh and faded valves. St. 28 (IIW), Reg. No. 20231; fresh valve. St. 29 (IIW), Reg. No. 20243; faded valves. St. 33 (IIW), Reg. No. 20261; fresh and faded valves. St. 34 (IIW), Reg. No. 20278; faded valves. St. 38 (IIW), Reg. No. 20297; fresh valve. St. 39 (IIW), Reg. No. 20303; faded valve. St. 41 (IIW), Reg. No. 21875; faded valves. St. 44 (IIW), Reg. No. 20340; faded valve. St. 48 (IIW), Reg. No. 20371; fresh valve. St. 53 (IIW), Reg. No. 20396; faded valves. St. 2 (IIIW), Reg. No. 20422; faded valve. St. 3 (IIIW), Reg. No. 20426; faded valves. St. 6 (IIIW), Reg. No. 20449; fresh and faded valves. St. 7 (IIIW), Reg. No. 20478; fresh and faded

valves. St. 8 (IIIW), Reg. No. 20494; faded valve. St. 7 (XIIU), Reg. No. 20704; faded valves. St. 11 (XIIU), Reg. No. 20728; faded valve. St. 12 (XIIU), Reg. No. 20743; faded valves. St. 15 (XIIU), Reg. No. 20777; fresh valve. St. 18 (XIIU), Reg. No. 20791; faded valve. St. 19 (XIIU), Reg. No. 20793; faded valve. St. 25 (XIIU), Reg. No. 20824; faded valve. St. 39 (XIIU), Reg. No. 20868; faded valves. St. 693 (HG), Reg. No. 21014; faded valves. St. 2 (KU), Reg. No. 21033; faded valves. St. 10 (KU), Reg. No. 21060; faded valve.

Pseudamusium intuscostatum tenuicostulatum YOKOYAMA[1)]

St. 8 (IW), Reg. No. 21137; fresh valves. St. 11 (IW), Reg. No. 21165; faded valves. St. 22 (IIW), Reg. No. 20176; fresh valve. St. 5 (IIIW), Reg. No. 20436; faded valve. St. 12 (XIIU), Reg. No. 20737; faded valve. St. 15 (XIIU), Reg. No. 20784; fresh valve. St. 45 (XIIU), Reg. No. 20898; faded valve. St. 694 (HG), Reg. No. 21019; fresh valve. St. 2 (KU), Reg. No. 21038; fresh valves. St. 10 (KU), Reg. No. 21061; fresh valves.

Hemipecten forbesianus ADAMS and REEVE (Juv.) ?

St. 9 (IIIW), Reg. No. 20506; faded valve. St. 388 (HG), Reg. No. 20965; faded valve. St. 682 (HG), Reg. No. 21003; faded valve.

Spondylus cruentus LISCHKE

St. 14 (IW), Reg. No. 21906; fresh valve. St. 20 (IIW), Reg. No. 20140; fresh valve. St. 26 (IIW), Reg. No. 12124; faded valve. St. 38 (XIIU), Reg. No. 20870; faded valve.

Limidae

Lima goliath SMITH

St. 2 (IW), Reg. No. 21070; faded valves. St. 22 (IIW), Reg. No. 20174; faded valves. St. 34 (IIW), Reg. No. 20269; fragment of large valve. St. 38 (IIW), Reg. No. 20295; fresh valve. St. 46 (IIW), Reg. No. 20351; fresh valve. St. 45 (XIIU), Reg. No. 20906; fresh and faded valves.

Lima japonica A. ADAMS

St. 2 (IW), Reg. No. 21068; fresh valves. St. 3 (IW), Reg. No.

1) This subspecies differs from the typical *intuscostatum* by having much less distinct internal ribs.

21085; fresh valves. St. 5 (IW), Reg. No. 21092; fresh valves. St. 6 (IW), Reg. No. 21122; fresh and faded valves. St. 7 (IW), Reg. No. 21125; fresh valve. St. 8 (IW), Reg. No. 21142; fresh valve. St. 9 (IW), 21157; fresh and faded valves. St. 13 (IW), Reg. No. 21195; fresh valve. St. 7 (IIW), Reg. No. 20088; faded valve. St. 20 (IIW), Reg. No. 20133; fresh valve. St. 21 (IIW), Reg. No. 20162; fresh and faded valves. St. 28 (IIW), Reg. No. 20200; fresh and faded valves. St. 33 (IIW), Reg. No. 20267; fresh valve. St. 34 (IIW), Reg. No. 20270; fresh valve. St. 40 (IIW), Reg. No. 20314; faded valves. St. 41 (IIW), Reg. No. 20328; fresh and faded valves. St. 7′ (XIIU), Reg. No. 20708; faded valves. St. 12 (XIIU), Reg. No. 20734; faded valve. St. 39 (XIIU), Reg. No. 20873; fresh valve. St. 2 (KU), Reg. No. 21034; fresh valve.

Lima lima Linné

St. 5 (IW), Reg. Nos. 21095, 21097; fresh and small faded valves. St. 6 (IW), Reg. No. 21118; small faded valve. St. 8 (IW), Reg. No. 21144; small faded valve. St. 13 (IW), Reg. No. 21192; small, fresh valve. St. 14 (IW), Reg. No. 21202; small fresh valve. St. 21 (IIW), Reg. No. 20156; small fresh valve. St. 26 (IIW), Reg. No. 20192; small fresh and faded valves. St. 28 (IIW), Reg. No. 20233; faded valve. St. 38 (IIW), Reg. No. 20300; small fresh valve. St. 44 (IIW), Reg. No. 20344; fresh valve. St. 48 (IIW), Reg. No. 20374; small fresh valve. St. 39 (XIIU), Reg. No. 20866; small fresh valve.

Lima lima zushiensis Yokoyama

St. 28 (IIW), Reg. No. 20225; fragmental valve.

Lima lischkei Lamy

St. 4 (XIIU), Reg. No. 20670; fresh valves.

Lima smithi Sowerby

St. 22 (IIW), Reg. No. 20171; fragmental valves.

Lima subauriculata Montagu

St. 25 (IIW), Reg. No. 20284; fresh valves.

Anomiidae

Anomia cytaeum Gray

St. 8 (IIIW), Reg. No. 20497; fresh valve. St. 4 (XIIU), Reg.

No. 20678; fresh valve. St. 7′ (XIIU), Reg. No. 20713, fresh valve.

Pododesmus radiatus Sowerby

St. 12 (IW), Reg. No. 21182; fresh valve. St. 19 (IIW), Reg. No. 20119; fresh valve. St. 39 (XIIU), Reg. No. 20872; faded valve. St. 7 (KU), Reg. No. 21051; fresh valve. St. 568 (HG), Reg. No. 20983; fragmental valve.

Ostreidae

Ostrea gigas Thunberg

St. 28 (IIW), Reg. No. 20234; faded valve.

Ostrea musashiana Yokoyama*

St. 2 (IW), Reg. No. 21071; fresh and faded valves. St. 3 (IW), Reg. No. 21080; faded valves. St. 5 (IW), Reg. No. 21098; fresh and faded valves. St. 6 (IW), Reg. No. 21105; fresh valves. St. 7 (IW), Reg. No. 21126; fresh valves. St. 9 (IW), Reg. No. 21158; fresh valves. St. 10 (IW), Reg. No. 21164; fresh valve. St. 12 (IW), Reg. No. 21179; fresh and faded valves. St. 13 (IW), Reg. No. 21187; fresh valves. St. 14 (IW), Reg. No. 21205; fresh valves. St. 7 (IIW), Reg. No. 20086; fresh and faded valves. St. 19 (IIW), Reg. No. 20121; faded valves. St. 20 (IIW), Reg. No. 20136; fresh valves. St. 22 (IIW), Reg. No. 20196; fresh and faded valves. St. 28 (IIW), Reg. No. 20224; fresh and faded valves. St. 29 (IIW), Reg. No. 20240; fresh and faded valves. St. 32 (IIW), Reg. No. 20258; faded valves. St. 33 (IIW), Reg. No. 20262; faded valves. St. 34 (IIW), Reg. No. 20271; fresh and faded valves. St. 38 (IIW), Reg. No. 20288; fresh and faded valves. St. 40 (IIW), Reg. No. 20312; faded valves. St. 44 (IIW), Reg. No. 20343; faded valves. St. 46 (IIW), Reg. No. 20355; faded valves. St. 47 (IIW), Reg. No. 20360; fresh valves. St. 48 (IIW), Reg. No. 20372; fresh valve. St. 53 (IIW), Reg. No. 20390; fresh and faded valves. St. 3 (IIW), Reg. No. 20428; fresh and faded valves. St. 7 (IIIW), Reg. No. 20479; fresh valves. St. 1 (XIIU), Reg. No. 20635; fresh valve. St. 7 (XIIU), Reg. No. 20705; fresh valves. St. 19 (XIIU), Reg. No. 20792; fresh valves. St. 45 (XIIU), Reg. No. 20896; fresh valves. St. 46 (XIIU), 20902; fresh valves. St. 594 (HG), Reg. No. 20993; fresh valves. St. 692 (HG), Reg. No.

* Conchologically the distinction between *O. musashiana* Yokoyama and *O. rosacea* Deshayes is sometimes confusing.

21009; faded valve. St. 693 (HG), Reg. No. 21011; faded valves. St. 792 (HG), Reg. No. 20925; faded valves. St. 807 (HG), Reg. No. 20929; faded valve. St. 1 (KU), Reg. No. 21029; fresh valves. St. 5 (SG), Reg. No. 20907; faded valves.

Ostrea rosacea Deshayes

St. 5 (IW), Reg. No. 21898; imperfect valve. St. 21 (IIW), Reg. No. 20159; faded valves. St. 22 (IIW), Reg. No. 21882; fresh valves. St. 26 (IIW), Reg. No. 21905; faded valves. St. 28 (IIW), Reg. No. 21896; fresh and faded valves. St. 34 (IIW), Reg. No. 20271 (b); fresh valves. St. 38 (IIW), Reg. No. 20288 (b), fresh valves. St. 40 (IIW), Reg. No. 20312 (b), faded valves. St. 44 (IIW), Reg. No. 20343 (b), faded valves. St. 46 (IIW), Reg. No. 20355 (b), faded valves. St. 47 (IIW), Reg. No. 20362; faded valves. St. 6 (IIIW), Reg. No. 20444; faded valves. St. 1 (XIIU), Reg. No. 20639; fresh valves. St. 7 (XIIU), Reg. No. 20710; fresh valves. St. 26 (XIIU), Reg. No. 20840; faded valve. St. 7 (KU), Reg. No. 21045; fresh and faded valves.

Ostrea sinensis Sowerby

St. 1 (IIIW), Reg. No. 20411; fresh valves.

Astartidae

Astarte alaskensis Dall

St. 11 (IW), Reg. Nos. 21166, 21170; faded valves. St. 36 (IIW), Reg. No. 20286; faded valves. St. 12 (XIIU), Reg. No. 20735; faded valve.

Astarte borealis Schumacher

St. 22 (IIW), Reg. No. 20175; faded valves. St. 45 (IIW), Reg. No. 12128; fresh valve. St. 53 (IIW), Reg. No. 20389; faded valve. St. 54 (IIW), Reg. No. 20284; faded valve. St. 15 (XIIU), Reg. No. 20779; faded valves. St. 16 (XIIU), Reg. No. 20787; faded valve.

Crassatellitidae

Crassatellites nanus Adams and Reeve

St. 11 (IW), Reg. No. 21168; fragmental valve. St. 14 (IW), Reg. No. 21201; fresh and faded valves. St. 19 (IIW), Reg. No. 20118; faded valves. St. 53 (IIW), Reg. No. 12123; faded valve. St. 12

(XIIU), Reg. No. 20741; faded valve. St. 13 (XIIU), Reg. No. 20752; fragmental valve. St. 15 (XIIU), Reg. No. 20776; faded valve. St. 19 (XIIU), Reg. No. 20799; jointed and faded valves. St. 28 (XIIU), Reg. No. 20842; jointed valve.

Carditidae

Cardita cumingiana Dunker

St. 3 (IW), Reg. No. 21904; faded valve.

Cardita nodulosa Lamarck

St. 2 (IW), Reg. No. 21072; fresh and faded valves. St. 3 (IW), Reg. No. 21084; fresh valves. St. 5 (IW), Reg. No. 21087; fresh valves. St. 6 (IW), Reg. No. 21107; fresh and faded valves. St. 7 (IW), Reg. No. 21124; fresh, jointed and faded valves. St. 8 (IW), Reg. No. 21147; faded valve. St. 9 (IW), Reg. No. 21150; fresh and faded valves. St. 12 (IW), Reg. No. 21180; fresh valves. St. 13 (IW), Reg. No. 21186; fresh and faded valves. St. 7 (IIW), Reg. No. 20087; fresh and faded valves. St. 20 (IIW), Reg. No. 20131; faded valve. St. 21 (IIW), Reg. No. 20157; fresh and faded valves. St. 26 (IIW), Reg. No. 20185; fresh valves. St. 28 (IIW), Reg. No. 20230; fresh and faded valves. St. 29 (IIW), Reg. No. 20244; fresh and faded valves. St. 32 (IIW), Reg. No. 20260; faded valves. St. 33 (IIW), Reg. No. 20265; faded valves. St. 34 (IIW), Reg. No. 20274; fresh and faded valves. St. 38 (IIW), Reg. No. 20290; fresh and faded valves. St. 40 (IIW), Reg. No. 20318; fresh and faded valves. St. 41 (IIW), Reg. No. 20327; fresh and faded valves. St. 42 (IIW), Reg. No. 20337; fragmental valve. St. 44 (IIW), Reg. No. 20345; fresh and faded valves. St. 47 (IIW), Reg. Nos. 20361, 20363; faded valves. St. 48 (IIW), Reg. No. 20369; fresh valves. St. 4 (XIIU), Reg. No. 20664; fresh valve. St. 7 (XIIU), Reg. Nos. 20706, 20711; faded valves. St. 12 (XIIU), Reg. No. 20738; faded valve. St. 19 (XIIU), Reg. No. 20795; fresh and faded valves. St. 45 (XIIU), Reg. No. 20893; fresh valves. St. 807 (HG), Reg. No. 20932; faded valves. St. 2 (KU), Reg. No. 21036; faded valves. St. 10 (KU), Reg. No. 21053; faded valves.

Venericardia ferruginea A. Adams

St. 3 (IW), Reg. No. 21078; faded valves. St. 5 (IW), Reg. No. 21090; fresh valve. St. 6 (IW), Reg. No. 21116; fresh and faded

valves. St. 8 (IW), Reg. No. 21140; fresh valves. St. 13 (IW), Reg. No. 21190; fresh and faded valves. St. 7 (IIW), Reg. No. 20094; faded valves. St. 21 (IIW), Reg. No. 20155; fresh valves. St. 26 (IIW), Reg. No. 20194; fresh and faded valves. St. 28 (IIW), Reg. No. 20227; fresh valves. St. 29 (IIW), Reg. No. 20246; faded valve. St. 33 (IIW), Reg. No. 20264; faded valves. St. 40 (IIW), Reg. No. 20321; fresh valves. St. 41 (IIW), Reg. No. 20326; fresh valves. St. 48 (IIW), Reg. No. 20370; faded valve. St. 53 (IIW), Reg. No. 20395; fresh and faded valve. St. 6 (IIIW), Reg. No. 20443; faded valve. St. 7 (IIIW), Reg. No. 20463; fresh and faded valves. St. 8 (IIIW), Reg. No. 20491; fresh valves. St. 7 (XIIU), Reg. No. 20701; fresh valve. St. 7′ (XIIU), Reg. No. 20714; faded valve. St. 11 (XIIU), Reg. No. 20729; fresh valves. St. 12 (XIIU), Reg. No. 20742; faded valves. St. 14 (XIIU), Reg. No. 20769; faded valve. St. 18 (XIIU), Reg. No. 20788; fresh valves. St. 19 (XIIU), Reg. No. 20800; fresh valves. St. 26 (XIIU), Reg. No. 20838; faded valve. St. 39 (XIIU), Reg. No. 20787; faded valves. St. 383 (HG), Reg. No. 20957; small, faded valves. St. 549 (HG), Reg. No. 20978; fresh valve. St. 568 (HG), Reg. No. 20981; faded valve. St. 582 (HG), Reg. No. 20986; faded valves. St. 634 (HG), Reg. No. 20998; faded valves. St. 688 (HG), Reg. No. 21006; small, faded valves. St. 692 (HG), Reg. No. 21008; small, fresh valves. St. 693 (HG), Reg. No. 21013; faded valves. St. 702 (HG), Reg. No. 21027; faded valves. St. 786 (HG), Reg. No. 20923; faded valves. St. 2 (KU), Reg. No. 21035; fresh valve. St. 10 (KU), Reg. No. 21056; faded valves.

Isocardiidae

Meiocardia tetragona A. Adams

St. 7 (IW), Reg. No. 21127; fresh valves. St. 9 (IW), Reg. No. 21139; fresh valve. St. 14 (IW), Reg. No. 21204; faded valve. St. 21 (IIW), Reg. No. 20142; faded valves. St. 28 (IIW), Reg. No. 20204; faded valves. St. 39 (IIW), Reg. No. 20304; fresh valve. St. 53 (IIW), Reg. No. 20387; faded valve. St. 7 (XIIU), Reg. No. 20702; faded valve. St. 7′ (XIIU), Reg. No. 20715; faded valve.

Ungulinidae

Joannisiella cumingi Hanley

St. 3 (IW), Reg. No. 21079; small fresh valves. St. 13 (IW),

Reg. No. 21189; small fresh valve. St. 20 (IIW), Reg. No. 12121; faded valve. St. 53 (IIW), Reg. No. 20393; faded valve. St. 4 (XIIU), Reg. No. 20674; fresh valve. St. 7′ (XIIU), Reg. No. 20712; faded valve. St. 27 (XIIU), Reg. No. 20841; small fresh valve. St. 568 (HG), Reg. No. 20980; faded valve.

Axinopsis viridis DALL

St. 15 (IIIW), Reg. No. 20538; fresh valve.

Codakiidae

Loripes ictericus REEVE

St. 1 (XIIU), Reg. No. 20641; small fresh valve.

Lucina acutilineata CONRAD

St. 54 (IIW), Reg. No. 20406, faded valves.

Anodontia bialata PILSBRY

St. 25 (XIIU), Reg. No. 20828; small fragmental valve.

Codakia pisidium DUNKER

St. 14 (IIIW), Reg. No. 20530; fresh valve. St. 14 (XIIU), Reg. No. 20767; faded valve.

Erycinidae

Scintilla species indet.

St. 16 (IIW), Reg. No. 2011; fresh valve.

Montacutidae

Montacuta species indet.

St. 26 (IIW), Reg. No. 20190; fresh valve.

Chamidae

Chama reflexa REEVE

St. 5 (IW), Reg. No. 21878; faded valve. St. 14 (IW), Reg. No. 21199; fresh valves. St. 15 (IW), Reg. No. 21216; fresh valves. St. 19 (IIW), Reg. No. 20124; faded valve. St. 20 (IIW), Reg. No. 20135; faded valve. St. 26 (IIW), Reg. No. 20202; faded valve. St. 27 (IIW), Reg. No. 20223; faded valve. St. 28 (IIW), Reg. Nos. 12125, 21879;

faded valves. St. 32 (IIW), Reg. No. 20259; faded valve. St. 40 (IIW), Reg. No. 20315; faded valve. St. 4 (XIIU), Reg. No. 20666; fresh valves. St. 13 (XIIU), Reg. No. 20751; faded valve.

Cardiidae

Cardium arenicolum Reeve

St. 28 (IIW), Reg. No. 12116; fresh valve.

Cardium bülowi Rolle

St. 53 (IIW), Reg. No. 20386; faded valves. St. 36 (XIIU), Reg. No. 20862; fragmental valve. St. 545 (HG), Reg. No. 20974; fragmental valve. St. 589 (HG), Reg. No. 20989; small, fresh valve.

Cardium eoa Kuroda

St. 20 (IIW), Reg. No. 20139; fresh valve. St. 7′ (XIIU), Reg. No. 20716; faded valve. St. 582 (HG), Reg. No. 20988; fragmental valve.

Cardium samarangae Makiyama

St. 6 (IW), Reg. No. 21119; faded valve. St. 7 (IW), Reg. No. 21132; fragmental valve. St. 11 (IW), Reg. No. 21169; faded valve. St. 16 (IIW), Reg. Nos. 20103, 20112; fresh valve. St. 21 (IIW), Reg. No. 20158; faded valve. St. 30 (IIW), Reg. No. 20250; fresh valves. St. 31 (IIW), Reg. No. 20254; faded valves. St. 38 (IIW), Reg. No. 20291; fragmental valve. St. 44 (IIW), Reg. No. 20346; faded valve. St. 46 (IIW), Reg. No. 20353; faded valve. St. 6 (IIIW), Reg. No. 20451; fragmental valve. St. 6 (XIIU), Reg. No. 20695; fresh valves. St. 10 (XIIU), Reg. No. 20721; faded valve. St. 15 (XIIU), Reg. No. 20785; fresh valves. St. 19 (XIIU), Reg. No. 20801; fresh valves. St. 25 (XIIU), Reg. No. 20825; fresh valves. St. 36 (XIIU), Reg. No. 20860; faded valve. St. 39 (XIIU), Reg. No. 20876; fresh valve. St. 45 (XIIU), Reg. No. 20891; fresh valve. St. 10 (KU), Reg. No. 21055; fresh valve.

Cardium undatopictum Pilsbry

St. 1 (IIIW), Reg. No. 20280; fresh valves. St. 12 (IIIW), Reg. No. 20524; fresh and jointed valves. St. 14 (IIIW), Reg. No. 20527; fragmental valve. St. 13 (XIIU), Reg. No. 20757; fresh valve. St. 34 (XIIU), Reg. No. 20854; fresh valve.

Veneridae

Macrocallista sinensis Sowerby

St. 19 (IIW), Reg. No. 20127; fragmental valve. St. 1 (IIIW), Reg. No. 20409; fresh valves. St. 4 (IIIW), Reg. No. 20432; faded valve. St. 10 (IIIW), Reg. No. 20518; faded valves. St. 11 (IIIW), Reg. No. 21893; small, faded valve. St. 12 (IIIW), Reg. No. 20525; faded valve. St. 16 (IIIW), Reg. No. 20542; fresh valves. St. 20 (IIIW), Reg. No. 20561; fresh valves. St. 817 (HG), Reg. No. 20937; fragmental valve.

Lioconcha gordonis Yokoyama[1)]

St. 3 (XIIU), Reg. No. 20661; faded valve. St. 775 (HG), Reg. No. 20917; fresh valve. St. 963 (HG), Reg. No. 21886; fresh valve.

Pitar hukaurensis Nomura and Hatai

St. 231 (HG), Reg. No. 20956; faded valve. St. 629 (HG), Reg. No. 20997; faded valve. St. 822 (HG), Reg. No. 20940; faded valve.

Pitar japonica Kuroda?

St. 16 (IIW), Reg. No. 20106; faded valve.

Pitar subpellucida Sowerby

St. 7 (IW), Reg. No. 21133; faded valve. St. 8 (IW), Reg. No. 21143; faded valves. St. 14 (IW), Reg. No. 21203; fresh valves. St. 3 (IIW), Reg. No. 20429; fresh valves. St. 16 (IIW), Reg. No. 20109, faded valves. St. 19 (IIW), Reg. No. 20120; fragmental valve. St. 20 (IIW), Reg. No. 20138; faded valve. St. 28 (IIW), Reg. No. 20229; faded valve. St. 53 (IIW), Reg. No. 20338; fresh and faded valves. St. 6 (IIW), Reg. No. 20448; fresh valve. St. 7 (IIIW), Reg. Nos. 20480; fresh and faded valve. St. 8 (IIIW), Reg. No. 20487; faded valve. St. 6 (XIIU), Reg. No. 20693; faded valve. St. 11 (XIIU), Reg. No. 20727; faded valves. St. 12 (XIIU), Reg. No. 20739; fresh and faded valves. St. 19 (XIIU), Reg. No. 20794; fresh and faded valves. St. 25 (XIIU), Reg. No. 20822; faded valves. St. 26 (XIIU), Reg. No. 20836; fragmental valve. St. 38 (XIIU), Reg. No. 20864; faded valve. St. 39 (XIIU), Reg. No. 20869; fresh and faded valves. St. 383 (HG), Reg. No. 20958; fragmental valve. St. 693 (HG), Reg.

1) Yokoyama, Jour. Fac. Sci., Imp. Univ., Tokyo, sec. 2, vol. 1, pt. 10, p. 429, pl. 48, fig. 14, 1927 (not fig. 13, which is not a venerid mollusc).

No. 21015; faded valves. St. 694 (HG), Reg. No. 21018; faded valve.

Dosinia japonica Reeve

St. 15 (XIIU), Reg. No. 21880, small, fresh valve.

Venus foveolata Sowerby

St. 16 (IIW), Reg. No. 20107, small faded valve. St. 4 (IIIW), Reg. No. 20423; fragmental valve. St. 385 (HG), Reg. No. 20959; fresh valve.

Venus stimpsoni Gould

St. 6 (IIIW), Reg. No. 20452; fragmental valve.

Venus toreuma Gould

St. 5 (IW), Reg. No. 21091; faded valve. St. 14 (IW), Reg. Nos. 21209, 21206; faded valves. St. 19 (IIW), Reg. No. 20126; faded valve. St. 20 (IIW), Reg. No. 20132; faded valve. St. 26 (IIW), Reg. No. 20189; faded valve. St. 32 (IIW), Reg. No. 20256; fresh valves. St. 4 (XIIU), Reg. No. 20671; fresh valves.

Chione mindanensis Smith[1)]

St. 39 (XIIU), Reg. No. 20877; faded valve. St. 963 (HG), Reg. No. 20949; fresh valve.

Paphia amabilis Philippi?

St. 7 (IIIW), Reg. No. 20477; fragmental valve. St. 2 (XIIU), Reg. No. 20650; fragmental valve. St. 25 (XIIU), Reg. No. 20832; fragmental valve. St. 26 (XIIU), Reg. No. 20853; fresh and fragmental valves. St. 1054 (HG), Reg. No. 20952; fragmental valve.

Mactridae

Spisula bernardi Pilsbry

St. 19 (IIW), Reg. No. 20122; fragmental valve. St. 53 (IIW), Reg. No. 20392; fragmental valve.

Mactra crossei Dunker

St. 10 (IIW), Reg. No. 20514; small, faded valve.

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1) The shell resembles closely *Chione mindanensis* of Yokoyama (not Smith) described in Jour. Coll. Sci., Imp. Univ., Tokyo, vol. 44, art. 1, p. 150, pl. 11, figs. 2, 3, 1922.

Mactra sulcataria Deshayes (juv.)

St. 14 (XIIU), Reg. No. 20770; small, faded valve.

Anatina yokohamensis Pilsbry

St. 52 (IIW), Reg. No. 20379; fragmental valve.

Sanguinolaria olivacea Jay?

St. 26 (XIIU), Reg. No. 20837; fragmental valve.

Tellinidae

Macoma calcarea Gmelin

St. 656 (HG), Reg. No. 21000; fragmental valve.

Macoma praetexta v. Martens

St. 1 (IIIW), Reg. No. 20317; fresh valve. St. 11 (IIIW), Reg. No. 20517; faded valves. St. 12 (IIIW), Reg. No. 20523; faded valves. St. 13 (IIIW), Reg. No. 20528; fresh valve. St. 15 (IIIW), Reg. No. 20540; small fresh valves. St. 16 (IIIW), Reg. No. 20545; fresh valve. St. 23 (IIIW), Reg. No. 20570; fresh and faded valves.

Macoma secta Conrad

St. 10 (IIIW), Reg. No. 20515; fresh valve.

Tellina consanguinea Sowerby

St. 33 (XIIU), Reg. No. 20851; fresh valves.

Tellina jedoensis Lischke

St. 52 (IIW), Reg. No. 12107; faded valves. St. 1 (IIIW), Reg. No. 20373; fresh valves. St. 2 (IIIW), Reg. No. 20416; fresh valves. St. 11 (IIIW), Reg. No. 20522; faded valves. St. 15 (IIIW), Reg. No. 20540; faded valve. St. 16 (IIIW), Reg. No. 20543; fresh valves. St. 22 (IIIW), Reg. No. 20565; fresh valve. St. 23 (IIIW), Reg. No. 20569; fresh and faded valves. St. 4 (XIIU), Reg. No. 20663, fragmental valve, doubtful.

Tellina kurodai Makiyama

St. 8 (IIIW), Reg. No. 20496; faded valve.

Tellina miyatensis Yokoyama

St. 18 (IIIW), Reg. No. 21900; faded valve.

Tellina nitidula Dunker

St. 5 (IIIW), Reg. No. 20430; faded valve. St. 23 (IIIW), Reg. No. 20568; faded valve.

Tellina ovalis Sowebry

St. 23 (IIIW), Reg. No. 21897; faded valve.

Tellina species indet.

St. 8 (IIIW), Reg. No. 20492; fresh valve.

Solenidae

Siliqua pulchella Dunker

St. 1 (IIIW), Reg. No. 20410; fresh valves.

Solen krusensterni Schrenck

St. 15 (XIIU), Reg. No. 20780; fragmental valve, doubtful.

Hitellidae

Hiatella arctica Linné

St. 2 (IW), Reg. No. 21067; fresh and faded valves. St. 6 (IW), Reg. No. 21123; faded valve. St. 8 (IW), Reg. No. 21145; faded valves. St. 9 (IW), Reg. No. 21154; fresh valves. St. 10 (IW), Reg. No. 21163; fresh valves. St. 12 (IW), Reg. No. 21177; fresh valves. St. 7 (IIW), Reg. No. 20091; fresh valves. St. 21 (IIW), Reg. No. 20161; fresh and faded valves. St. 26 (IIW), Reg. No. 20201; fresh valve. St. 34 (IIW), Reg. No. 20276; fresh valves. St. 39 (IIW), Reg. No. 20307; fresh valves. St. 40 (IIW), Reg. No. 20313; faded valves. St. 41 (IIW), Reg. No. 20332; fresh valves. St. 42 (IIW), Reg. No. 20338; fresh valves. St. 44 (IIW), Reg. No. 20342; fresh and faded valves. St. 46 (IIW), Reg. No. 20352; fresh valves. St. 47 (IIW), Reg. No. 20366; faded valves. St. 53 (IIW), Reg. No. 20385; faded valve. St. 8(IIIW), Reg. No. 20495; fresh valve. St. 4 (XIIU), Reg. No. 20669; faded valve. St. 19 (XIIU), Reg. No. 20797; fresh valves. St. 45 (XIIU), Reg. No. 20894; fresh valves. St. 693 (HG), Reg. No. 21010; fresh valves. St. 2 (KU), Reg. No. 21037; fresh valves. St. 7 (KU), Reg. No. 21049; fresh valves.

Panomya nipponica Nomura and Hatai, var.

St. 22 (IIW), Reg. No. 20172; faded valve.

Aloididae

Aloides rotalis Hinds

St. 7 (IIIW), Reg. No. 20457; fresh valve. St. 8 (IIIW), Reg. No. 20486; fresh valve.

Aloides scaphoides Hinds

St. 8 (IW), Reg. No. 21148; faded valve. St. 26 (IIW), Reg. No. 20198; faded valve. St. 28 (IIW), Reg. Nos. 12110, 20232; fresh and faded valves. St. 4 (XIIU), Reg. No. 20668; fresh valves.

Aloides substriata Yokoyama

St. 545 (HG), Reg. No. 20975; faded valve. St. 691 (HG), Reg. No. 21007; fresh valve. St. 695 (HG), Reg. No. 21021; faded valve.

Aloides venustus Gould

St. 29 (IIW), Reg. No. 20245; faded valve. St. 33 (IIW), Reg. No. 20263; faded valve. St. 4 (XIIU), Reg. No. 20673; fresh valves. St. 13 (XIIU), Reg. No. 20750; faded valve.

Pholadidae

Jouannetia globosa Quoy and Gaimard

St. 6 (IIW), Reg. No. 20354; fragmental valve. St. 45 (XIIU), Reg. No. 20900; imperfect valves.

"Jouannetia" yabei Yokoyama

St. 7 (KU), Reg. No. 21044; fresh valve.

Calopodiidae

Calopodium japanense Nomura and Hatai

St. 16 (IIW), Reg. No. 20113; faded valve. St. 8 (IIIW), Reg. No. 20505; faded valve. St. 39 (XIIU), Reg. No. 20880; fresh valves. St. 10 (KU), Reg. No. 21059; faded valve.

Myochamidae

Myadora fluctuosa Gould

St. 16 (IIW), Reg. No. 20105; fresh valves. St. 31 (IIW), Reg. No. 20255; fresh valves. St. 7 (IIIW), Reg. No. 20460; fresh valves. St. 8 (IIIW), Reg. No. 20493; fresh valve. St. 9 (IIIW), Reg. No.

20508; faded valves. St. 1 (XIIU), Reg. No. 20636; fresh valve. St. 14 (XIIU), Reg. No. 20768; faded valve. St. 24 (XIIU), Reg. No. 20819; fresh valves. St. 25 (XIIU), Reg. No. 20826; fresh valve. St. 36 (XIIU), Reg. No. 20861; fresh valves. St. 39 (XIIU), Reg. No. 20881; fresh valves. St. 387 (HG), Reg. No. 20962; fragmental valve. St. 702 (HG), Reg. No. 21029; fresh valves. St. 779 (HG), Reg. No. 20919; fresh valves. St. 7 (KU), Reg. No. 21048; fresh valves.

Pholadomyidae

Pholadomya japonica Dall

St. 21 (IIW), Reg. No. 20160; fragmental valve.

Thraciidae

Thracia sematana Yokoyama

St. 10 (KU), Reg. No. 21058; fresh valve.

Thracia transmontana Yokoyama

St. 13 (IW), Reg. No. 21194; fresh valves. St. 26 (IIW), Reg. No. 20195; fresh valves.

Clavagellidae

Clavagella cf. *japonica* Yokoyama

St. 5 (IW), Reg. No. 21899; fragmental valve.

Poromyidae

Poromya flexuosa Yokoyama

St. 6 (IW), Reg. No. 21116; fresh valve. St. 13 (IW), Reg. No. 21193; fresh and faded valves. St. 30 (IIW), Reg. No. 20251; faded valve. St. 38 (IIW), Reg. No. 20301; fresh valves. St. 2 (IIIW), Reg. No. 20418; fresh valve. St. 6 (IIIW), Reg. No. 20450; fresh valve. St. 7 (IIIW), Reg. No. 20459; fresh valve.

Cuspidariidae

Cuspidaria chinensis Griffith and Pidgeon

St. 53 (IIW), Reg. No. 20400, fragmental valve. St. 545 (HG), Reg. No. 20973; small faded valve.

II. SCAPHOPODA

Siphonodentaliidae

Siphonodentalium ozawai Yokoyama

St. 1054 (HG), Reg. No. 20953; complete specimens.

Dentaliidae

Dentalium buccinulus Gould

St. 940 (HG), Reg. No. 20944; fragmental specimen.

Dentalium corsucum Pilsbry

St. 9 (IIIW), Reg. No. 20512; fragmental specimen. St. 1 (XIIU), Reg. No. 20647; fragmental specimen. St. 36 (XIIU), Reg. No. 20863; fragmental specimen, doubtful. St. 579 (HG), Reg. No. 20985; fragmental specimen.

Dentalium crocinum Dall

St. 13 (IW), Reg. No. 21198; complete specimens. St. 21 (XIIU), Reg. No. 20813; fragmental specimen. St. 36 (XIIU), Reg. No. 20865; fragmental specimen doubtful. St. 45 (XIIU), Reg. No. 20901; fragmental specimen.

Dentalium habutae Kuroda and Kikuchi[1)]

St. 16 (IIW), Reg. No. 20114; complete and fragmental specimens. St. 34 (IIW), Reg. No. 20282, fresh specimen. St. 5 (IIIW), Reg. No. 20439; fresh specimens. St. 6 (IIIW), Reg. No. 20455; fragmental specimen. St. 12 (XIIU), Reg. No. 20746; fresh specimen. St. 15 (XIIU), Reg. No. 20773; fragmental specimen. St. 25 (XIIU), Reg. No. 20830; fresh specimen. St. 39 (XIIU), Reg. No. 20887; fresh specimens. St. 387 (HG), Reg. No. 20964; fragmental specimen.

Dentalium nivosum Kuroda and Kikuchi

St. 5 (IIIW), Reg. No. 20438; perfect specimens. St. 6 (IIIW), Reg. No. 20453; perfect specimen. St. 7 (IIIW), Reg. Nos. 20464, 20473; perfect and imperfect specimens. St. 39 (XIIU), Reg. No.

1) The type is said to have six or seven axial ribs and not provided with an interstitial riblet, while most of the specimens in the collection under examination have eight axials which are often associated with a finer one between them.

21890; fragmental specimens. St. 387 (HG), Reg. No. 21888; fragmental specimens.

Dentalium rhabdotum Pilsbry

St. 11 (IW), Reg. No. 21173; fragmental specimen. St. 22 (IIW), Reg. No. 20180; complete specimens. St. 26 (IIW), Reg. No. 20214; fragmental specimen. St. 45 (IIW), Reg. Nos. 12127, 20350; fragmental specimen. St. 46 (IIW), Reg. No. 20359; fresh specimens. St. 54 (IIW), Reg. No. 20398; fragmental specimen. St. 4 (IIIW), Reg. No. 20435; fragmental specimens. St. 5 (IIIW), Reg. No. 20440; fresh fragmental specimen. St. 8 (IIIW), Reg. No. 20501; fragmental specimen. St. 10 (XIIU), Reg. No. 20725; fresh specimens. St. 20 (XIIU), Reg. No. 20811; fresh specimen. St. 23 (XIIU), Reg. No. 20816; fresh specimen. St. 24 (XIIU), Reg. No. 20820; fragmental specimens. St. 39 (XIIU), Reg. No. 20882; fragmental specimen. St. 47 (XIIU), Reg. No. 20905; fragmental specimen. St. 579 (HG), Reg. No. 20984; fragmental specimen. St. 780 (HG), Reg. No. 20991, fragmental specimen.

Dentalium tibanum Nomura (MS)

St. 28 (XIIU), Reg. No. 20846; complete specimens.

Dentalium toyamense Kuroda and Kikuchi

St. 17 (IIW), Reg. No. 12120; incomplete specimen. St. 6 (IIIW), Reg. No. 20456; doubtful, incomplete specimen. St. 4 (KU), Reg. No. 21044; incomplete specimen.

Dentalium weinkauffi Dunker

St. 47 (IIW), Reg. No. 20364; fragmental specimen. St. 10 (IIIW), Reg. No. 20521; complete specimen. St. 16 (IIIW), Reg. No. 20546; fragmental specimens. St. 18 (IIIW), Reg. No. 20556; fragmental specimens. St. 1 (XIIU), Reg. No. 20645; fragmental specimens. St. 19 (XIIU), Reg. No. 20806; fragmental specimen.

Dentalium yamakawai Yokoyama

St. 13 (XIIU), Reg. No. 20760; complete specimens.

Dentalium species indet.

St. 3 (XIIU), Reg. No. 20656; fragmental specimen. St. 13 (XIIU), Reg. No. 20759; fragmental specimen.

III. GASTROPODA

Fissurellidae

Emarginula crassicostata Sowerby

St. 2 (IW), Reg. No. 21075; fine specimen. St. 41 (IIW), Reg. No. 20336; fine specimen.

Emarginula foveolata Sowerby

St. 2 (IW), Reg. No. 21074; fresh specimen. St. 9 (IW), Reg. No. 21159; faded specimens. St. 14 (IW), Reg. No. 21213; fresh specimen. St. 7 (IIW), Reg. No. 20101; fragmental specimen. St. 21 (IIW), Reg. No. 20149; fine and fragmental specimens. St. 26 (IIW), Reg. No. 20217; small, fragmental specimen. St. 29 (IIW), Reg. No. 20249; fresh specimen. St. 38 (IIW), Reg. No. 20292; faded specimen. St. 46 (XIIU), Reg. No. 20904; faded specimen.

Emarginula fragilis Yokoyama

St. 7 (IIW), Reg. No. 20096; faded specimen. St. 21 (IIW), Reg. No. 20168; faded specimen.

Puncturella fastigiata A. Adams

St. 53 (IIW), Reg. No. 20405; fresh specimen. St. 7 (IIIW), Reg. No. 20469; fresh specimen. St. 8 (IIIW), Reg. No. 20500; fresh specimen. St. 39 (XIIU), Reg. No. 20884; fresh specimen.

Puncturella nobilis A. Adams

St. 5 (IW), Reg. No. 21102; fresh specimen. St. 6 (IW), Reg. No. 21110; faded specimen. St. 11 (IW), Reg. No. 21175; fresh specimen. St. 21 (IIW), Reg. No. 20169; fresh specimen. St. 26 (IIW), Reg. No. 20205; fresh specimen. St. 12 (XIIU), Reg. No. 20744; fresh specimen. St. 10 (KU), Reg. No. 21064; fresh specimens.

Acmaeidae

Acmaea conulus Dunker

St. 5 (IW), Reg. No. 21100; faded specimen.

Acmaea pygmaea Dunker

St. 26 (IIW), Reg. No. 20212; faded specimens. St. 13 (XIIU), Reg. No. 20765; faded specimens.

Trochidae

Turcica imperialis A. Adams

St. 2 (IW), Reg. No. 21073; fragmental specimens. St. 5 (IW), Reg. No. 21101; fresh specimen. St. 6 (IW), Reg. No. 21113; fragmental specimen. St. 7 (IW), Reg. No. 21136; fragmental specimen. St. 14 (IW), Reg. No. 21215; fragmental specimen. St. 7 (IIW), Reg. No. 20100; fragmental specimens. St. 21 (IIW), Reg. No. 20164; fresh and fragmental specimens. St. 26 (IIW), Reg. No. 20211; fragmental specimens. St. 3 (IIW), Reg. No. 21887; fresh specimen. St. 39 (IIW), Reg. No. 20310; fragmental specimen. St. 40 (IIW), Reg. No. 12126; fresh specimen. St. 41 (IIW), Reg. No. 20334; fresh specimen. St. 44 (IIW), Reg. No. 20348; imperfect specimen. St. 53 (IIW), Reg. No. 20402; imperfect specimen. St. 7 (IIIW), Reg. No. 20471; small, fresh specimen.

Turcicula crumpii Pilsbry

St. 22 (IIW), Reg. No. 20179; fresh specimens. St. 23 (IIW), Reg. No. 20183; imperfect specimen. St. 36 (IIW), Reg. No. 20287; imperfect specimen. St. 44 (IIW), Reg. No. 20349; fresh specimens. St. 46 (IIW), Reg. No. 20357; imperfect specimens. St. 10 (XIIU), Reg. No. 20723; fresh specimen. St. 20 (XIIU), Reg. No. 20812; imperfect specimens. St. 45 (XIIU), Reg. No. 20899; fresh specimens. St. 1 (KU), Reg. No. 21031; fresh specimen.

Solariella angulata Tokunaga

St. 30 (IIW), Reg. No. 20252; fragmental specimen.

Solariella peramabilis pseudobscura Yokoyama

St. 53 (IIW), Reg. No. 20399; small, fresh specimen. St. 2 (IIIW), Reg. No. 20425; fine specimen. St. 7 (IIIW), Reg. No. 20476; fine specimen.

Calliostoma aculeatum Sowerby

St. 14 (IIIW), Reg. No. 20534; small, fresh specimen.

Calliostoma haliarchum Melvill

St. 34 (IIW), Reg. No. 20283; fragmental specimen. St. 13 (XIIU), Reg. No. 20762; small perfect specimen.

Calliostoma hungerfordi Sowerby

St. 2 (IW), Reg. No. 21076; perfect specimen. St. 6 (IW), Reg.

Nos. 21109, 21111; fragmental specimens. St. 21 (IIW), Reg. No. 20165; faded specimens. St. 26 (IIW), Reg. No. 20206; small, faded specimens. St. 38 (IIW), Reg. No. 20293; faded specimen.

Cantharidella callichroa PHILIPPI

St. 4 (XIIU), Reg. No. 20688; small fresh specimen. St. 13 (XIIU), Reg. No. 20764; small fresh specimen.

Enida japonica A. ADAMS

St. 26 (IIW), Reg. No. 20210; fine specimen. St. 53 (IIW), Reg. No. 20401; fine specimens. St. 6 (IIIW), Reg. No. 20454; fine specimen. St. 7 (IIIW), Reg. No. 20465; fine and imperfect specimens. St. 8 (IIIW), Reg. No. 20498; fine specimen.

Clanculus microdon ater PILSBRY

St. 4 (XIIU), Reg. No. 20687; fragmental specimen.

Monilea lifuana FISCHER

St. 4 (XIIU), Reg. No. 20691; fresh specimen.

Umbonium moniliferum costatum KIENER

St. 28 (XIIU), Reg. No. 20844; fresh specimen.

Cyclostrematidae

Cyclostrema cinguliferum A. ADAMS

St. 10 (KU), Reg. No. 21063; fresh specimen.

Turbinidae

Collonista pilula DUNKER

St. 4 (XIIU), Reg. No. 20680; fresh and perfect specimens.

Homalopoma amusitatum GOULD

St. 3 (IW), Reg. No. 10411; imperfect specimens, doubtful. St. 4 (XIIU), Reg. No. 20684; faded specimen.

Homalopoma granuliferum NOMURA and HATAI

St. 21 (IIW), Reg. No. 20148; fine specimen. St. 44 (IIW), Reg. No. 20347; fine specimen.

Homalopoma purpurescens DUNKER

St. 33 (IIW), Reg. No. 20268; fine specimen.

Homalopoma sangarense SCHRENCK

St. 26 (IIW), Reg. No. 20207; small specimens. St. 53 (IIW), Reg. No. 20397; faded specimen. St. 4 (XIIU), Reg. No. 20682; small specimen. St. 2 (KU), Reg. No. 21039; faded specimen.

Liotina semiclathratula SCHRENCK

St. 3 (IW), Reg. No. 10404; imperfect specimen. St. 5 (IW), Reg. No. 21103; fine small specimens. St. 26 (IW), Reg. No. 20220; fine specimen. St. 4 (XIIU), Reg. No. 20681; small fresh specimens.

Liotia cf. *crenata* KIENER

St. 28 (IIW), Reg. No. 20238; fine specimens.

Rissoidae

Alvania etizenica n. sp.

Pl. I, Fig. 8

Description.—Shell small, elongate, more or less *Turbonilla*-like in outline and sculpture, yellowish; nuclear whorls about two, uppermost one very small, deeply and obliquely immersed in second whorl; post-nuclear whorls six, bearing with axial ribs and spiral grooves, convex around middle and parted by deep sutures; axials about thirteen on last whorl, extending from upper suture to upper half of base spirals four on last whorl above periphery, rather markedly grooved, separated by wider interspaces; periphery and base rounded, latter marked like space between sutures, but spirals are fainter and of them about five separated by nearly equal interspaces in width; aperture obliquely ovate, with rather acute posterior angle; outer lip thin; columella with a narrowly spread, but rather thick callus.

Dimension.—5 mm; diameter 2 mm.

Type.—A single, rather imperfect specimen; Reg. No. 20572.

Locality.—St. 23 (IIIW), off Hukui Prefecture.

Alvania wakasana n. sp.

Pl. I, Fig. 4

Description.—Shell small, ovate, light yellowish white; nuclear whorls two, rounded, smooth; post-nuclear whorls five, convex, most convex part lies nearer to lower suture, marked by rounded, subvertical axial ribs numbering fifteen on last whorl; interspaces nearly equal to ribs in width, and ornamented by a few, rather marked spiral threads;

of these spirals about six appear on last whorl above periphery; periphery rounded, where axial ribs obsoleted; base convex, marked by coarse spiral theads only; aperture oval, lips simple.

Dimension.—Height 2.5 mm; diameter 1.7 mm.

Type.—A single perfect specimen; Reg. No. 20573.

Locality.—St. 23 (IIIW), off Hukui Prefecture.

Tachyrhynchus species indet.

St. 20 (XIIU), Reg. No. 21910; faded fragmental specimen.

Turritella fascialis Menke

St. 21 (IIW), Reg. No. 20166; fresh specimen. St. 7 (IIIW), Reg. No. 20474; small faded specimen. St. 9 (IIIW), Reg. No. 20513; faded specimens. St. 14 (IIIW), Reg. No. 20535; fresh specimen. St. 18 (IIIW), Reg. No. 20555; faded specimen. St. 3 (XIIU), Reg. No. 20155; fresh specimen.

Turritella tibana Nomura

St. 20 (XIIU), Reg. No. 20810; faded specimens.

Vermetidae

Siliquaria cumingi Mörch

St. 7 (IW), Reg. No. 21135; perfect specimen. St. 7 (IIW), Reg. No. 20099; fragmental specimen. St. 28 (IIW), Reg. Nos. 20208, 20236; perfect and imperfect specimens. St. 38 (IIW), Reg. No. 20299; imperfect specimens. St. 41 (IIW), Reg. No. 20335; imperfect specimen. St. 4 (XIIU), Reg. No. 20692; imperfect specimen.

Cerithiidae

Bittium urasimanum n. sp.

Pl. I, Fig. 3

Description.—Shell rather large, elongate conic, grayish white; nuclear whorls two, globular, smooth; post-nuclear whorls ten, angulate below middle, separated by well marked sutures; surface with axial ribs and spiral cords; axials about thirteen on body-whorl; rounded, subvertical, narrower than interspaces, extending from summit of whorls to lowest spiral cords which is close to lower suture; main spirals three, middle one strongest, other two being nearly equal in strength; there are also a few obsolete spiral threads on surface; peri-

phery of last whorl angulate; base plano-convex, with a single spiral cord near periphery, inner lip concave above, straight below; outer lip and canal fractured.

Dimension.—ca. Height 12 mm; diameter ca. 5 mm.

Type.—A single, more or less imperfect specimen; Reg. No. 20921.

Locality.—St. 10 (XIIU), off Hukui Prefecture .

Cerithium kochi PHILIPPI

St. 33 (XIIU), Reg. No. 20852; fresh specimens. St. 34 (XIIU), Reg. No. 20855; fresh specimen.

Cerithium pfeiferi DUNKER

St. 10 (IIIW), Reg. No. 20520; faded specimen.

Triphoridae

Triphora fusca DUNKER

St. 26 (IIW), Reg. No. 21912; fresh specimens. St. 4 (XIIU), Reg. No. 20685; fresh specimen.

Triphora otsuensis YOKOYAMA

St. 5 (IW), Reg. No. 21099; faded specimen, St. 26 (IIW), Reg. No. 20219; fresh specimen.

Pyramidellidae

Turbonilla actopora DALL and BARTSCH

St. 16 (IIIW), Reg. No. 20551; fresh specimen.

Turbonilla pseudapproximata NOMURA

St. 16 (IIIW), Reg. No. 20547; fresh specimen.

Strombidae

Strombus japonica REEVE

St. 19 (IIIW), Reg. No. 20557; fresh specimens. St. 1 (XIIU), Reg. No. 20646; fragmental specimen. St. 28 (XIIU), Reg. No. 20847; fresh specimens.

Naticidae

Polinices didymus (BOLTEN) RÖDING

St. 28 (XIIU), Reg. No. 20845; fragmental specimen.

Polinices draconis DALL

St. 22 (IIW), Reg. No. 20181; faded specimen. St. 26 (IIW), Reg. No. 20222; faded specimen. St. 10 (IIIW), Reg. No. 20724; faded specimen.

Polinices pallidus pila PISBRY

St. 30 (IIW), Reg. No. 20253; fresh specimen. St. 16 (IIIW), Reg. No. 20548; small questionable specimen.

Natica clausa BRODERIP and SOWERBY

St. 9 (IW), Reg. No. 21161; fresh specimen. St. 12 (IW), Reg. No. 21183; faded specimen. St. 18 (IW), Reg. No. 20790; small, faded specimen. St. 22 (IIW), Reg. No. 20147; faded specimen. St. 40 (IIW), Reg. No. 20325; faded specimen.

Natica figurata SOWERBY

St. 26 (IIW), Reg. No. 20215; fresh specimen.

Natica species indet.

St. 15 (XIIU), Reg. No. 20778; large fresh operculum only.

Eunaticina papila GMELIN

St. 14 (XIIU), Reg. No. 20771; fresh specimen.

Cypraeidae

Erato callosa ADAMS and REEVE

St. 4 (XIIU), Reg. No. 20683; faded specimen. St. 13 (XIIU), Reg. No. 20763; faded specimen.

Cymatiidae

Argobuccinum oregonense REDFIELD

St. 2 (IW), Reg. No. 21077; imperfect specimens. St. 11 (IW), Reg. No. 21174; perfect and imperfect specimens. St. 7 (IIW), Reg. No. 20098; imperfect specimen. St. 22 (IIW), Reg. No. 20182; imperfect specimens. St. 23 (IIW), Reg. No. 20184; perfect specimens. St. 39 (IIW), Reg. No. 20309; perfect and imperfect specimens. St. 7 (XIIU), Reg. No. 20717; imperfect specimen. St. 1 (KU), Reg. No. 21032; perfect and imperfect specimens.

Muricidae

Murex wakasanus n. sp.

Pl. I, Fig. 10

Description.—Shell small, fusiform, solid, light brown; nuclear whorls lost; post-nuclear whorls seven, angular, convex slightly above middle of whorl-height, below vertical or somewhat receeded; suture deep, well marked; surface marked by axial ribs and spiral cords; former rounded, prominent on upper whorls, almost obsolete on body-whorl, separated by generally wider interspaces in breadth; spirals prominent, somewhat frimbriated wavy, increasing in number toward lower whorl, six on penultimate whorl and seven on last whorl between shoulder and lower suture, associated with invariably a few interstitial striae besides three or four finer ones on area above angle; periphery of last whorl rounded; base convex, rather abruptly narrowed; canal long, narrow, curved and perfectly closed; aperture small, ovate; outer lip thin, with a strong terminal varix behind it; inner regularly convex, covered by a thick callus whose edge is free from body-whorl.

Dimension.—Height ca. 25.5 mm; diameter 11.2 mm.

Type.—A single, rather perfect specimen; Reg. No. 10402.

Locality.—St. 5 (IW), off Hukui Prefecture.

Trophon exstra Dall

St. 681 (HG), Reg. No. 21002; fragmental specimen.

Tritonalia adunca Sowerby

St. 11 (XIIU), Reg. No. 20730; fresh and faded specimens.

Tritonalia lumaria Yokoyama?

St. 21 (IIW), Reg. No. 20167; fragmental specimen. St. 53 (IIW), Reg. No. 20403; fragmental specimen.

Pyrenidae

Mitrella anachisoides n. sp.

Pl. I, Fig. 7

Description.—Shell rather large, moderately solid, shortly fusiform like *M. bouchardi* Dunker, light brown; whorls about eight with bluntly pointed apex; nuclear whorls two, smooth globular, post-nuclear whorls slightly convex around surface with axial ribs and

spiral grooves; ribs many, slender, rather sharp-topped, extending from upper suture to lower, but on body-whorl, they do not extend into base; interspaces wider than ribs themselves; spirals usually obsolete, but distinct on basal part and on small area in front of sutures; periphery rounded; aperture ovate-rhombic with a thin outer lip which is smooth within; columella well curved in middle, with a rather marked callus; canal short, wide, not well differentiated from aperture.

Dimension.—17 mm; diameter 8.4 mm.

Type.—A single, well preserved specimen; Reg. No. 10403.

Locality.—St. 6 (IW), off Hukui Prefecture.

Mitrella lischkei Smith

St. 7 (IIIW), Reg. No. 20470; fresh and faded specimens. St. 39 (XIIU), Reg. No. 20885; fresh specimen.

Mitrella varians Dunker

St. 4 (XIIU), Reg. No. 20686; fresh specimens.

Mitrella varians buchardi Dunker

St. 6 (IW), Reg. No. 2114; faded specimen.

Buccinidae

Colus mitrellaformis Nomura (MS)

St. 13 (IW), Reg. No. 10410; faded specimen.

Microfusus lischkei Kuroda

St. 7 (IIIW), Reg. No. 20472; faded specimen. St. 39 (XIIU), Reg. No. 20883; fragmental specimen.

Neptunea arthritica Bernardi

St. 39 (IIW), Reg. No. 20308; small, imperfect specimen.

Neptunea intersculpta Sowerby

St. 51 (IIW), Reg. No. 20378; fresh specimen.

Siphonalia cassidariaeformis Reeve

St. 2 (XIIU), Reg. No. 20652; fragmental specimen.

Siphonalia spadicea Reeve

St. 9 (IW), Reg. No. 21160; faded specimens. St. 14 (IW), Reg. No. 21214; fresh specimen. St. 16 (IIW), Reg. No. 20116; faded

specimens. St. 26 (IIW), Reg. No. 20218; fresh specimen. St. 29 (IIW), Reg. No. 20248; fragmental specimen. St. 34 (IIW), Reg. No. 20281; fresh specimens. St. 53 (IIW), Reg. No. 20404; small, faded specimen. St. 2 (IIIW), Reg. No. 20424; fragmental specimen. St. 5 (IIIW), Reg. No. 20442; fresh specimen. St. 7 (XIIU), Reg. No. 20699; faded specimen. St. 11 (XIIU), Reg. No. 20731; fresh specimen. St. 15 (XIIU), Reg. No. 20774; faded specimen. St. 18 (XIIU), Reg. No. 20789; faded specimen. St. 29 (XIIU), Reg. No. 20833; fresh specimen.

Siphonalia stearnsi PILSBRY

St. 19 (XIIU), Reg. No. 20805; imperfect specimen.

Phos urasimensis n. sp.

Pl. I, Fig. 11

Description.—Shell small, shortly fusiform, light cream spotted with brown; whorls seven, upper three nuclear ones smooth and rounded; post nuclear whorls convex in middle, separated by distinct sutures; surface marked by rather prominent, subequal axial ribs, of which there are about eighteen on last whorl; interspaces somewhat wider than ribs themselves; spiral cords strong, about six appear upon penultimate and last whorls above periphery; crossing points of ribs and cords nodulose; entire surface also marked by many fine growth lines; periphery of last whorl subangulate; base rather abruptly narrowed and continued to a short, somewhat recurved canal; aperture narrow-oval; outer lip thin, showing external sculpture within by transmitent light.

Dimension.—8 mm; 4 mm. The paratype specimen is nearly equal to the holotype in size.

Type.—A fine specimen; Reg. No. 20690 (holotype). A single faded specimen; Reg. No. 21017 (paratype).

Locality.—St. 4 (XIIV), the type locality; St. 693 (HG), off Hukui Prefecture.

Searlesia species indet.

St. 25 (XIIU), Reg. No. 20831; faded imperfect specimen.

Babylonia japonica REEVE

St. 19 (IIIW), Reg. No. 20559; fresh and perfect specimen. St. 22 (IIIW), Reg. No. 20566; fresh and perfect specimens. St. 23 (IIIW), Reg. No. 20571; imperfect specimen.

Nassariidae

Nassarius caelatus A. Adams

St. 36 (XIIU), Reg. No. 20886; fragmental specimen.

Nassarius dominulus Tapparone-Canefri

St. 16 (IIIW), Reg. No. 20550; faded specimen.

Nassarius gemmulatus Lamarck

St. 20 (IIIW), Reg. No. 20564; faded specimen. St. 28 (XIIU), Reg. No. 20848; fresh specimen.

Nassarius(?) species indet.

St. 4 (XIIU), Reg. No. 20689; fragmental specimen.

Peristernia coreanica Smith

St. 6 (IW), Reg. Nos. 10400, 21112; fragmental specimens. St. 13 (IIW), Reg. No. 21197; faded specimen. St. 21 (IIW), Reg. No. 20151; fresh specimens. St. 5 (IIIW), Reg. No. 20441; faded specimen.

Fusinus nipponicus Smith

St. 7 (IIIW), Reg. No. 20467; small faded specimen.

Fusinus perplexus A. Adams

St. 792 (HG), Reg. Nos. 10409, 20926; fragmental specimens.

Fusinus simplex Smith

St. 13 (IW), Reg. No. 10408; small specimen, doubtful. St. 42 (IIW), Reg. No. 20339; fresh specimen. St. 25 (XIIU), Reg. No. 20829; small specimen, doubtful.

Olividae

Oilvella fulgurata Adams and Reeve?

St. 5 (IW), Reg. No. 21104; fresh specimen. St. 12 (IIIW), Reg. No. 20526; faded specimen.

Cancellariidae

Admete hukuiensis n. sp.

Pl. I, Fig. 5

Description.—Shell rather large, irregularly oval, grayish yellow

with bluish white within aperture; whorls six, last whorl very large with a bluntly pointed apex; nuclear whorls about two, smooth rounded; post-nuclear whorls shouldered above, convex in middle, separated by deep, canaliculated sutures; sculpture consisting of axial ribs and spiral lines; former about twelve on last whorl, somewhat nodulous; interspaces more or less irregular in width, much broader than axial ribs; spiral lines many, close-set; periphery rounded; base broad, convex, marked by faint axial and many subequal spiral lines; aperture quadrate; outer lip thin, smooth within; inner lip concave, covered by a thick callus; columellar plications three, oblique, subequal in strength; canal very short, hardly differentiated from aperture.

Dimension.—Height 26.5 mm; diameter 18.2 mm.

Type.—A single, perfect specimen; Reg. No. 20296.

Locality.—St. 38 (IIW), off Hukui Prefecture.

Marginellidae

Hyalina japonica Nomura and Hatai

St. 26 (IIW), Reg. No. 20216; fresh specimen.

Hyalina perovulum Yokoyama

St. 26 (IIW), Reg. No. 20221; fresh specimen. St. 696 (HG), Reg. No. 21024; fresh specimen. St. 740 (HG), Reg. No. 20915; fresh specimen. St. 898 (HG), Reg. No. 20941; fresh specimen.

Turridae

Clavatula consimilis Smith

St. 2 (IIIW), Reg. No. 20423; perfect specimen.

Turris leucotropis Adams and Reeve

St. 19 (IIIW), Reg. No. 20558; fresh specimen. St. 20 (IIIW), Reg. No .20562; fresh and faded specimens.

Mangelia hukuiensis n. sp.

Pl. I, Fig. 6

Description.—Shell very small, fusiform, whitish; whorls eight, upper two nuclear, globular and smooth; first post-nuclear whorl rounded, with many fine axial threads, rest angular in middle, marked by axial ribs and spiral lines; axial prominent seven, rounded nodulous by crossing spiral lines; interspaces broad, as broad as about three

times ribs themselves; spiral lines rather distinct two on each spire-whorl, three on last whorl above periphery which is broadly rounded; entire surface covered by minute microscopic net-work sculpture; base elongated with obsolete axials and about eight spiral lines; apperture elongated with a short, slightly recurved canal below; columella oblique, somewhat curved, covered with a thin callus; outer lip and posterior sinus fractured.

Dimension.—Height 7 mm; diameter ca. 3 mm.

Type.—A single, imperfect faded specimen; Reg. No. 21909.

Locality.—St. 16 (IIIW), off Hukui Prefecture.

Lora(?) *gentatuana* n. sp.

Pl. I, Figs. 1a, 1b

Description.—Shell stout, fusiform, light purple encircled with brown bands; whorls eleven, apical two nuclear, globular and smooth; post-nuclear whorls convex in middle, marked by axial ribs and spiral lines; suture distinct, more or less undulated; axial ribs prominent, slightly flexuose, about twenty-three appear on penultimate whorl, twenty-seven on last whorl besides a terminal varix; interspaces wider than ribs, crossed by slender, sometimes obsolete, spiral threads numbering about fifteen on penultimate whorl; periphery of last whorl broadly rounded; base convex, broadly marked by faint axials and rather marked spiral lines; posterior angle of aperture acute; columella concave covered with a moderately thick callus; outer lip smooth within; canal very short, widely open, and its base truncated; not sinuated posteriorly.

Dimension.—Height 28 mm, diameter 10.2 mm.

Type.—A single somewhat imperfect specimen; Reg. No. 21134 (holotype). Two paratype specimens are smaller than the type; Reg. Nos. 21134, 20150.

Locality.—St. 7 (IW); St. 21 (IIW), off Hukui Prefecture.

Lora suganumana Nomura (MS)

St. 26 (IIW), Reg. No. 20213; imperfect specimen. St. 28 (IIW), Reg. No. 20237; perfect specimen. St. 34 (IIW), Reg. No. 20284; imperfect specimen. St. 7 (IIIW), Reg. No. 20475, perfect specimen.

Lora suturalineata Nomura and Hatai

St. 1 (IIIW), Reg. No. 20413; fine specimens. St. 589 (HG), Reg. No. 20991; fragmental specimens.

Lora species indet.

St. 792 (HG), Reg. No. 20728; imperfect specimen.

Lienardia togetoges n. sp.

Pl. I, Figs. 2a, 2b

Description.—Shell small, slender, fusiform, whitish; whorls nine, apical one smooth, succeeding two axially and finely striated, rest well rounded in middle, with a distinct cancellated sculpture; suture deep; axial thread-like ribs about twenty on last whorl, extending from upper suture to a short distance from periphery below; interspaces wider than threads; spiral lines equal to axials, five on penultimate and six on last whorl above periphery; crossing points of axials and spirals being spinose; periphery rounded; base rather abruptly narrowed, marked by seven smooth spiral lines; aperture ovate; outer lip thin showing external sculpture within posterior sinus which is deep, narrow, close to suture; columella slender, curved, almost free from callus; canal short, wide, slightly recurved.

Dimension.—Height 10 mm; diameter 4 mm.

Type.—A single, perfect specimen; Reg. No. 20468.

Locality.—St. 7 (IIIW), off Hukui Prefecture.

Lienardia vadososinuata n. sp.

Pl. I, Figs. 9a, 9b

Description.—Shell small, fusiform, solid, faded yellow; whorls seven? (apical ones lost in type specimen), well rounded in middle, separated by undulate scutures; surface cancellated by crossing of spiral and axial threads of nearly equal strength; spirals about five on convex area of penultimate and last whorls, besides a few somewhat finer ones on area in front of suture; axial lines sixteen on last whorl extending from upper suture to caudal area of base; interspaces about two times as wide as axial threads; periphery rounded, base constricted below, sculptured nearly like space between sutures; aperture elongated; posterior sinus broad and shallow; outer lip sharpened at edge, about ten lirae, or dentate internally; inner lip concave above, oblique below, covered by a thin callus; canal short, recurved, widely open.

Dimension.—Height 10.4 mm; diameter 4.6 mm.

Type.—A single specimen lacking its nuclear whorls; Reg. No. 21915 (holotype). The paratype specimen also lacks the apical whorl; Reg. No. 20615.

Locality.—St. 26 (IIW); St. ? (exact locality not known), off Hukui Prefecture.

Terebridae

Terebra awajiensis Pilsbry

St. 20 (IIIW), Reg. No. 20563, fresh specimen.

Terebra lischkeana Dunker

St. 1 (IIIW), Reg. No. 20412; perfect specimen. St. 10 (IIIW), Reg. No. 20519; perfect specimen.

Ringiculidae

Ringicula doliaris Gould

St. 4 (IIIW), Reg. No. 20434; faded specimen.

Retusidae

Rhizorus tokunagai Makiyama

St. 8 (IIIW), Reg. No. 20499; faded specimen.

Philinidae

Philine japonica Lischke?

St. 52 (IIW), Reg. No. 20380; fragmental specimen.

Triclidae

Cylichna sibaénsis Yamakawa

St. 388 (HG), Reg. No. 20967; imperfect specimen.

Cylichna musashiensis Tokunaga

St. 8 (IW), Reg. No. 21149; perfect specimen. St. 19 (IIW), Reg. No. 20128; imperfect specimen. St. 26 (IIW), Reg. No. 20209; perfect specimen. St. 40 (IIW), Reg. No. 20324; perfect specimen. St. 549 (SG), Reg. No. 20910; perfect specimens.

Cylichna yamakawai Yokoyama

St. 11 (IW), Reg. No. 21172; perfect specimen. St. 16 (IIW), Reg. No. 20115; perfect and faded specimens. St. 7 (IIIW), No. 20466; perfect specimens.

Cavolinidae

Cavolina longirostris Lesseur

St. 13 (IW), Reg. No. 21196; perfect specimen. St. 7 (IIIW), Reg. No. 20462; imperfect specimen. St. 10 (IIIW), Reg. No. 20516; imperfect specimen. St. 16 (IIIW), Reg. No. 20544; imperfect specimen. St. 12 (XIIU), Reg. No. 20745; imperfect specimen. St. 13 (XIIU), Reg. No. 20761; perfect specimen. St. 792 (HG), Reg. No. 20927; perfect specimen. St. 940 (HG), Reg. No. 20945; perfect specimen.

Cavolina uncinata Rang

St. 39 (XIIU), Reg. No. 20888;* perfect specimen.

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* From the doubtful stations at Gentatuse, the following forms which are not represented in the above list were examined: *Pecten yessoensis* Jay, *Pecten puncticulatus* Dunker, *Ringicula aehlertiae* Morlet, *Colus spitbzergensis* Reeve, *Chlamys allida pseudalveata* Nomura, *Hipponyx conicus* Schumacher, *Eulima* cf. *hozoensis* Yokoyama, *Epitonium* cf. *sagamiense* Pilsbry, *Triphora tricincta* Dunker, *Rissoina laevicostulata* Pilsbry, *Cingula* cf. *mundana* Yokoyama, *Turbo coronutus* Solander, *Haliotis kamtshatkana* Jonas and some other indeterminable small forms.

A small collection made by the Sôyô-maru of the Imperial Fisheries Institute, Tôkyô, from the St. 549 at Gentatu-se comprises the following species: *Ostrea rosacea* Deshayes, *Lima japonica* A. Adams, *Cardita nodulosa* Lamarck, *Glycymeris yessoensis* Sowerby and *Cylichna musashiensis* Tokunaga.

Explanation of Figures.

Figs. 1a, 1b. *Lora gentatuana* n. sp., ×1.
Figs. 2a, 2b. *Lienardia togetoges* n. sp., ×3.
Fig. 3. *Bittium urasimanum* n. sp., ×2.
Fig. 4. *Alvania wakasana* n. sp., ×10.
Fig. 5. *Admete hukuiensis* n. sp., ×1.
Fig. 6. *Mangelia hukuiensis* n. sp., ×5.
Fig. 7. *Mitrella anachisoides* n. sp., ×2.
Fig. 8. *Alvania ctigonica* n. sp., ×5.
Figs. 9a, 9b. *Lienardia vadososinuata* n. sp., ×5.
Fig. 10. *Murex wakasanus* n. sp., ×2.
Fig. 11. *Phos urasimensis* n. sp., ×5.

Sinozaki photo.

Mollusca Dredged by the Husa-maru from the Pacific Coast of Tiba Prefecture, Japan

By

Sitihei Nomura

(With 1 Plate)

Saitô Hô-on Kai Museum, Sendai, Japan

Introduction

Reports on the marine fauna dredged by the surveying ship Husa-maru, of the Tiba Fisheries Experimental Station at Hôzyô-Tateyama-mati, Awa province, during the years of 1931–33, are as follows:

1) Hatai, K.: A List of the Recent Brachiopoda Dredged from the Littoral Sea of the Pacific Side of Bôsô Peninsula, Central Japan. Rec. Ocean. Wks. Jap., vol. 8, no. 1, 1936.

2) Nisiyama, S.: Annotated List of the Ophiurians Dredged from the Pacific Coast of Tiba Prefecture. Rec. Ocean. Wks. Jap., vol. 9, no. 1, 1937.

3) Nisiyama, S.: Annotated List of Echinoids Dredged from the Pacific Coast of Tiba Prefecture. Ibid., 1937.

4) Hatai, K.: Sedimentation from an Oceanographic View. Ibid., vol. 9, no. 2, 1937.

Further, the marine algae collected by the same ship was treated by K. Okamura, in 1934 in a paper entitled "Notes on Algae Dredged from the Pacific Coast of Tiba Prefecture" (Rec. Ocean. Wks. Jap., vol. 6, no. 1).

This is the sixth report on the collection and treats exclusively the molluscan fauna; the material is now stored in the Saitô Hô-on Kai Museum.*

The fauna, as a whole, consists of the types common in Central Japan, but some of them have their geographic distribution either south or north of the present area.

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* The duplicate collection is in the Tiba Fisheries Experimental Station at Hôzyô-Tateyama-mati, Tiba-ken.

The following is a list of the new species and one new genus:

1. *Nuculana* (*Jupiteria*) *husamaru* n. sp.
2. *Cuspidaria* (*s.s.*) *suganumai* n. sp.
3. *Dentalium* (*Antalis*) *tibanum* n. sp.
4. *Tibatrochus husaensis* n. gen. and n. sp.
5. *Turritella* (*Hustator*) *tibana* n. sp.
6. *Colus* (*Aulacofusus*) *mitrellaformis* n. sp.
7. *Turris* (*Gemmula*) *husamaru* n. sp.
8. *Turris* (*Gemmula*) *pseudogranosa* n. sp.
9. *Mangelia subgracilenta* n. sp.
10. *Lora kazusensis* n. sp.
11. *Lora suganumana* n. sp.

At this place I wish to offer my hearty thanks to Mr. K. SUGANUMA, Director of the Tiba Fisheries Experimental Station at Hôzyo-Tate-yama-mati and other gentlemen of the Station for their sincere interest in the marine faunae inhabiting the Pacific coast of Tiba prefecture, for which they have given great efforts in dredge operation and other oceanographical observations. They have generously agreed to donate the specimens to the Museum.

Oceanographic Records

Station	Locality	Depth (m)*	Temperature (C)	
			Surface	Bottom
1	N. of Tyôsi	Not given	Not given	Not given
2	Do.	Do.	Do.	Do.
3	Do.	13	Do.	Do.
4	Do.	12	Do.	Do.
5	Do.	Not given	Do.	Do.
6	Do.	Do.	Do.	Do.
7	NE. of Tyôsi	Do.	Do.	Do.
8	Do.	Do.	Do.	Do.
9	E. of Tyôsi	8	Do.	Do.
10	Do.	15.4	Do.	Do.
11	Do.	22.0	Do.	Do.
12	Do.	Not given	Do.	Do.
13	NE. of Inubô-zaki	Do.	Do.	Do.
14	Do.	26	Do.	Do.

* The depths of certain stations differ according to NISIYAMA and HATAI owing to dredge operation having been prosecuted during a period of three years, during which time different depths have been given for the same station numbers. Also the same station numbers have been plotted in different years thus accounting for the differences.

15	Off E. of Inubô-zaki	40	Not given	Not given
16	Do.	Not given	Do.	Do.
17	S. of Inubô-zaki	Do.	Do.	Do.
18	SE. of Inuwaka	Do.	Do.	Do.
19	Do.	Do.	Do.	Do.
20	Off SE. of Inuwaka	28	Do.	Do.
21	Off E. of Iioka	Not given	Do.	Do.
22	SE. of Iioka	35	Do.	Do.
23	Do.	12	22.2	20.7
24	Do.	24	22.7	18.5
25	Off. E. of Kido	39	21.8	17.2
26	E. of Kido	21	Not given	Not given
27	Do.	17	Do.	Do.
28	Do.	Not given	Do.	Do.
29	Do.	10	Do.	Do.
30	Do.	Not given	Do.	Do.
31	NE. of Katakai	Do.	Do.	Do.
32	Do.	14	Do.	Do.
33	Do.	21	Do.	Do.
34	E. of Katakai	30	Do.	Do.
35	Do.	Not given	Do.	Do.
36	SE. of Katakai	14	22.7	22.3
37	Do.	21	22.3	21.2
38	Off SE. of Katakai	30	23.3	20.5
39	Do.	44	25.1	17.8
40	Do.	83	24.6	14.3
41	N. of Taitô-zaki	10.8	23.4	21.2
42	Do.	15.4	23.8	20.2
43	NE. of Taitô-zaki	22	23.6	18.5
44	Off NE. of Taitô-zaki	104	20.7	13.8
45	Off E. of Taitô-zaki	130.5	25,1	13.0
46	Off E. of Ôhara	78	23.3	15.5
47	Katuura bay	17	21.5	19.5
48	Do.	15	22.5	16.5
49	Off Katuura bay	22	Not given	Not given
50	Do.	Not given	23.8	Do.
51	Ubara bay	5	22.0	Do.
52	Off SE. of Ubara	86–90	Not given	Do.
53	Off S. of Ubara	130–177	21.9	13.3
54	Do.	150	21.0	13.6
55	Off SE. of Kominato	140–154	21.6	17.0
56	Between Kominato and Kamogawa	50–94	23.0	16.5
57	Do.	80–116	26.9	16.7
58	Do.	47	26.2	24.3
59	Do.	20–37	26.5	25.3
60	Do.	17–25	26.4	23.2

61	Do.	80	23.0	15.2
62	Do.	131–189	25.5	15.9
63	Do.	200	27.2	14.6
64	Do.	55–84	26.5	19.0
65	Do.	100	26.4	19.5
66	Do.	110	25.6	17.3
67	Do.	245	26.0	15.6
68	E. of Nabuto	100–105	25.7	16.5
69	Do.	57–74	24.3	17.0
70	SE. of Nabuto	40–70	26.3	21.5
71	Do.	156–185	25.8	12.3
72	Do.	32	25.0	?
73	Do.	87–90	25.8	16.5
74	Do.	123–124	26.2	24.3
75	E. of Wada	22–24	26.8	21.5
76	SE. of Wada.	102–103	25.4	14.8
77	Do.	110–160	25.6	16.3
78	Do.	33–41	25.6	20.0
79	Do.	40–51	25.5	20.1
80	Do.	67–100	24.8	15.5
81	Do.	132–154	26.7	12.6
82	Between Minami-Asai and Nozima-zaki	24–27	26.8	21.5
83	Do.	49–58	25.8	18.0
84	Do.	106–113	26.0	15.5
85	Do.	130–147	26.0	14.2
86	Do.	124–156	26.0	14.2
87	Do.	35–36	26.1	22.2
88	Do.	120	26.0	14.8
89	Do.	122–140	25.4	13.3
90	Do.	65–72	25.6	16.6
91	Do.	37	26.8	17.8

Station and Fauna

St. 2 :—*Arca* (*s.s.*) *boucardi, Terebra* (*Pervicacia*) *bifrons, Umbonium* (*Suchium*) *moniliferum costatum.*

St. 3 :—*Fusinus nipponicus, Terebra* (*Strioterebrum*) *torquata, Turris* (*Gemmula*) *husamaru, Turris* (*Gemmula*) *pseudogranosa.*

St. 5 :—*Anadara* (*Scapharca*) *nipponensis, Cardita* (*Venericardia*) *ferruginosa, Dentalium* (*Antalis*) *weinkauffi, Ostrea* (*Crassostrea*) *gigas, Venerupis* (*Amygdala*) *philippinarum.*

St. 6 :—*Arca* (*s.s.*) *boucardi, Terebra* (*Previcacia*) *bifrons.*

St. 8 :—*Venus* (*Antigona*) *foveolata.*

St. 9 :—*Calopodium* (*Kennerlia*) *japonicum, Cardita* (*Venericardia*) *ferruginosa, Turris* (*Gemmula*) *husamaru.*

St. 10 :—*Ostrea* (*Pycnodonta*) *musashiana, Sunetta* (*Sunettina*) *menstrualis,*

Fusinus nipponicus, Turris (Gemmula) granosa.

St. 12:—*Lyonsia (Entodesma) navicula, Protothaca schrencki,*
Solen krusensterni, Neptunea (Barbitonia) arthritica,
Olivella fortunei, Thais (Mancinella) bronni.

St. 14:—*Dentalium (Antalis) weinkauffi, Siphonalia cassidariaeformis.*

St. 15:—*Glycymeris albolineata, Lima (s.s.) lima,*
Dentalium (Antalis) tibanum, Calliostoma aculeatum,
Cirsotrema (Amaea) magnificum.

St. 17:—*Anadara (Scapharca) nipponensis, Cantharus (Pollia) subrubiginosus,*
Natica (Tectonatica) janthostoma, Pyrene (Mitrella) varians,
Thais (Mancinella) bronni, Thais (Mancinella) luteostoma.

St. 23:—*Barnea (Anchomasa) fragilis, Gastrana japonica,*
Lithophaga (Adula) californiensis, Lyonsia (s.s.) ventricosa,
Protothaca euglypta, Protothaca schrencki,
Volsella (s.s.) margaritacea, Brachytoma japonica,
Calliostoma hungerfordi, Calliostoma unicum,
Cymatium (Cabestana) kiiense, Cymatium (s.s.) tenuliratum,
Searlesia fuscolabiata, Tritonalia adunca,
Umbonium (Suchium) moniliferum costatum.

St. 24:—*Cardium (Clinocardium) bülowi, Calliostoma hungerfordi,*
Cantharus (Pollia) undulatus.

St. 25:—*Calopodium (Kennerlia) japonicum, Cuspidaria chinensis,*
Limopsis multistriata, Tellina (Peronidia) kesenensis,
Tellina (Fabulina) nitidula, Venus (Clansinella) tiara,
Volsella (s.s.) margaritacea, Dentalium (Fustiaria) nipponicum,
Dentalium (Antalis) weinkauffi, Brachytoma jefferysi,
Calliostoma hungerfordi, Clavatula patruelis,
Epitonium harimense, Nassarius (Alectrion) balteatus,
Siphonalia stearnsi, Terebra (Pervicacia) bifrons,
Terebra (Hastula) diversa, Terebra (Punctotererum) lischkeana,
Terebra (Strioterebrum) loebeckeana.

St. 26:—*Babylonia japonica, Brachytoma jeffreysi,*
Terebra (Pervicacia) bifrons.

St. 27:—*Brachytoma jeffreysi, Siphonalia cassidariaeformis.*

St. 28:—*Neptunea (Barbitonia) arthritica.*

St. 30:—*Batillaria zonalis, Brachytoma japonica,*
Nassarius (Niotha) livescens, Nucella freycincti,
Polinices (Neverita) didymus, Pyrene (Anachis) impolita,
Pyrene (Mitrella) varians, Siphonalia cassidariaeformis,
Siphonalia fusoides, Tritonalia ? sp. indet,
Umbonium (Suchium) moniliferum.

St. 31:—*Batillaria zonalis, Cantharus (Pollia) undulatus,*
Lienardia (Etrema) fortilirata, Nassarius (Tritonella) fraterculus,
Nucella freycincti, Polinices (Neverita) didymus,
Terebra (Pervicacia) bifrons, Terebra (Hastula) diversa.

St. 38:—*Anadara (Scapharca) nipponensis, Venus (Clansinella) tiara,*
Limopsis multistriata, Pseudogrammatodon dalli,
Dentalium (Antalis) weinkauffi, Brachytoma jeffreysi,

Cantharus (Pollia) subrubiginosus, Cantharus (Pollia) undulatus,
Clavatula patruelis, Nassarius (Alectrion) balteatus,
Pyrene (Mitrella) varians, Terebra (Strioterebrum) loebeckeana.

St. 39:—*Nassarius (Niotha) gemmulatus, Turris (s.s.) leucotropis.*

St. 42:—*Glycymeris albolineata, Nuculana (Jupiteria) confusa,*
Tellina (Moerella) jedoensis, Brachytoma japonica,
Calliostoma hungerfordi, Calliostoma unicum,
Epitonium (Turbiniscala) pyramidale, Terebra (Pervicacia) bifrons,
Umbonium (Suchium) moniliferum costatum.

St. 44:—*Limopsis crenata, Macoma (s.s.) transculpta,*
Nucula (s.s.) cyrenoides, Ostrea (Crassostrea) circumpicta,
Tellina (Arcopagia) serricostata, Dentalium (Antalis) weinkauffi,
Clavatula patruelis, Enida japonica,
Epitonium (Viciniscala) neglectum, Fusinus nipponicus,
Homalopoma granuliferum, Lischkeia (Turcicula) crumpi,
Lora kazusensis, Mathilda sinensis,
Olivella fortunei, Polinices (Euspira) pallidus,
Puncturella fastigiata, Pyrene (Mitrella) bicinctella,
Pyrene (Mitrella) varians, Siphonalia spadicea,
Terebra (Pervicacia) evoluta.

St. 45:—*Acila (Truncacila) insignis, Anomia cytaeum,*
Arca (s.s.) boucardi, Chama refleza,
Chlamys (s.s.) irregularis, Chlamys (Aequipecten) vesiculosa,
Crassatellites oblongatus, Cuspidaria chinensis,
Kellia porcula, Lima (Limatula) japonica,
Lima (s.s.) quantoensis, Limopsis crenata,
Lucina (Lucinoma) acutilineata, Lyonsia (Entodesma) navicula,
Macoma (s.s.) nipponica, Meiocardia tetragona,
Nemocardium samarangae, Nuculana (Thestyleda) yokoyamai,
Pholadomya pacifica, Poromya flexuosa,
Propeamusium (Pseudamusium) intuscostatum, Protothaca euglypta,
Pseudogrammatodon dalli, Spisula (Mactromeris) voyi,
Spondylus anacanthus, Taras (Joannisiella) cumingi,
Volsella (s.s.) margaritacea, Dentalium (Fissidentalium) hungerfordi,
Dentalium (Laevidentalium) lubricatum, Acmaea pallida,
Bursa (Butonariella) ranelloides, Cirstorema (Acriella) ojiense,
Conus sieboldi, Cymatium (Septa) equatile,
Cypraea (Erronea) japonica, Distortio reticulata,
Emarginula (s.s.) foveolata, Epitonium (Cinctiscala) sagamiense,
Fulgolaria (Psephaea) concinna, Fusinus graciliformis,
Fusinus nipponicus, Homalopoma granuliferum,
Lemintina dentifera, Liotia (Arene) cranata?
Lora suganumana, Mitra (Nebularia) hanleyana,
Nassarius (Zeuxis) variciferus, Nucella freycincti,
Polinices (s.s.) flemingianus, (Neosimnia) hirasei,
Solariella sakya, Solariella stearnsi,
Tibatrochus husaensis Turris (Gemmula) granosa,
Turritella (Haustator) tibana.

St. 47:—*Arca* (*s.s.*) *arabica, Tritonalia fournieri.*

St. 48:—*Barbatia* (*Acar*) *plicata, Chlamys* (*s.s.*) *irregularis,*
Chlamys (*Aequipecten*) *vesiculosa, Lima* (*s.s.*) *lima,*
Lima (*s.s.*) *lima zushiensis, Pitar* (*Pitarina*) *subpellucida,*
Bursa (*Butonariella*) *ranelloides.*

St. 49:—*Acila* (*Truncacila*) *insignis.*

St. 50:—*Irus mitis, Calliostoma unicum,*
Cerithium (*Proclava*) *kochi, Cypraea* (*Erosaria*) *helvola,*
Cypraea (*Pustularia*) *nucleus, Turbo* (*Batillus*) *coronutus,*
Umbonium (*Suchium*) *moniliferum costatum.*

St. 51:—*Cardita* (*Venericardia*) *ferruginosa, Macoma* (*Psammacoma*) *awajiensis,*
Siphonalia cassidariaeformis, Terebra (*Punctoterebra*) *awajiensis.*

St. 53:—*Anomia cytaeum, Arca* (*s.s.*) *arabica,*
Arcopagia (*Merisca*) *serricostata, Cardita* (*Venericardia*) *ferruginosa,*
Chama reflexa, Chlamys (*Aequipecten*) *vesiculosa,*
Cuspidaria (*s.s.*) *suganumai, Dosinia* (*Phacosoma*) *japonica,*
Glycymeris yamakawai, Gomphina neastartoides,
Hiatella arctica, Lima (*Ctenoides*) *lischkei,*
Macoma (*s.s.*) *transculpta, Myadora fluctuosa,*
Nuculana (*Thestyleda*) *yokoyamai, Pitar* (*Pitarina*) *subpellucida,*
Protothaca jedoensis, Pseudogrammatodon dalli,
Volsella (*s.s.*) *margaritacea, Dentalium* (*s.s.*) *habutae,*
Dentalium (*Antalis*) *weinkauffi, Acmaea* (*Collisellina*) *saccharina,*
Brachytoma varicosa, Calliostoma aculeatum,
Cellana toreuma, Clavatula patruelis,
Colus (*Aulacofusus*) *mitrellaformis, Enida japonica,*
Homalopoma granuliferum, Microfusus lischkei,
Murex (*Poirieria*) *azami, Puncturella fastigiata,*
Siphonalia spadicea, Solariella sakya,
Turcica imperialis, Turris (*s.s.*) *unedo.*

St. 54:—*Chlamys* (*Aequipecten*) *vesiculosa, Glycymeris yamakawai,*
Venus (*Antigona*) *foveolata, Dentalium* (*Fustiaria*) *nipponicum,*
Architectonica perspectiva, Fusinus nipponicus,
Homalopoma granuliferum, Natica (*s.s.*) *vitella,*
Siphonalia cassidariaeformis, Siphonalia stearnsi,
Solariella sakya.

St. 55:—*Ostrea* (*Pycnodonta*) *musashiana.*

St. 58:—*Anadara* (*s.s.*) *tricenicosta, Chlamys* (*Aequipecten*) *vesiculosa,*
Gari maculosa, Lima (*Ctenoides*) *lischkei.*

St. 61:—*Aloides venusta, Arca* (*s.s.*) *arabica,*
Cardita (*s.s.*) *cumingiana, Chama reflexa,*
Gastrana yantaiensis, Lima (*Ctenoides*) *lischkei,*
Lima (*s.s.*) *lima zushiensis, Montacuta* sp. indet.,
Ostrea (*Lopha*) *rosacea, Petricola mirabilis,*
Pseudogrammatodon dalli, Septifer keenae,
Solen gordonis, Volsella (*s.s.*) *traillii.*

St. 73:—*Cantharus* (*Pollia*) *undulatus.*

St. 77:—*Arca* (*s.s.*) *arabica, Cardita* (*s.s.*) *cumingiana,*

Cardita (Venericardia) ferruginosa, Chama reflexa,
Chama (Pseudochama) retroversa, Chlamys (Aequipecten) vesiculosa,
Dosinia (Austrodosinia) histrio, Dosinia (Phaeosoma) japonica,
Erodona frequens, Lima (Ctenoides) lischkei,
Lima (s.s.) lima zushiensis, Limopsis cumingi,
Ostrea (Lopha) rosacea, Plicatula horrida,
Solen grandis, Spisula (Oxyperas) benardi,
Venus (Cleussinella) tiara, Venus (s.s.) toreuma,
Volsella (s.s.) traillii.

St. 78:—*Aloides scaphoides, Cardium (Acanthocardia) exasperatum,*
Chlamys (s.s.) irregularis, Chlamys (Aequipecten) vesiculosa,
Lima (Limaria) basilanica, Calliostoma aculeatum,
Clavatula patruelis, Fusinus nipponicus,
Nassarius (Niotha) gemmulatus, Nassarius (Zeuxis) variciferus,
Siphonalia spadicea.

St. 79:—*Lima (s.s.) lima zushiensis, Astrea (Bolma) modesta girgylla.*

St. 81:—*Glycymeris yamakawai, Ostrea (Pycnodonta) musashiana,*
Dentalium (Antalis) weinkauffi, Fusinus nipponicus,
Solariella sakya, Turcica imperialis.

St. 82:—*Arcopagia serricostata, Chama reflexa,*
Chlamys (Aequipecten) vesiculosa, Cuspidaria chinensis,
Astrea (Bolma) modesta, Fusinus graciliformis,
Fusinus nipponicus, Homalopoma granuliferum,
Turris (Gemmula) granosa.

St. 83:—*Anomia cytaeum, Arca (s.s.) arabica,*
Arcopagia (Merisca) ojiensis, Arcopagia (Merisca) serricostata,
Barbatia (s.s.) decussata, Barbatia (s.s.) stearnsi,
Cardita (Venericardia) ferruginosa, Chlamys (Aequipecten) vesiculosa,
Glycymeris pilsbryi, Lima (s.s.) lima,
Lima (Ctenoides) lischkei, Macoma (Psammacoma) awajiensis,
Macrocallista (Paradione) sinensis, Ostrea (Pycnodonta) musashiana,
Pitar (Pitarina) subpellucida, Spisula (Oxypras) bernardi,
Venus (Clasinella) tiara, Dentalium (Antalis) pretiosum,
Argobuccinum (Biplex) percum, Hipponyx (s.s.) conicus.

St. 85:—*Cardita (Venericardia) ferruginosa, Cardita (s.s.) nodulosa,*
Chlamys (s.s.) irregularis, Chlamys (s.s.) squamata,
Chlamys (Aequipecten) vesiculosa, Cuspidaria chinensis,
Hiatella arctica, Limopsis azumana,
Limopsis s-kinoshitai, Nuculana (Jupiteria) husamaru,
Ostrea (Pycnodonta) musashiana, Poromya flexuosa,
Dentalium (Laevidentalium) lubricatum, Dentalium (Antalis) rhabdotum,
Dentalium (Antalis) weinkauffi, Argobuccinum (Biplex) percum,
Brachytoma varicosa, Calliostoma multiliratum,
Conus sieboldi, Emarginula (s.s.) foveolata,
Epitonium (Decussiscala) castum, Epitonium (Viciniscala) neglectum,
Fusinus nipponicus, Mangelia subgracilenta,
Microfusus magnificus, Murex (Poirieria) azami,
Nassarius (Zeuxis) variciferus, Peristernia coreanica,

Solariella sakya, Tritonalia (s.s.) plorator,
Turris (Gemmula) granosa, Turris (s.s.) unedo,
Typhis (Cyhonchellus) arcuata, Urosalpinx pachyrhaphe.

Systematic List

PELECYPODA

Family **Nuculidae**

Genus *Nucula* LAMARCK

1. *Nucula (s.s.) cyrenoides* KURODA[1]
   Reg. No. 18144,[2] two valves; st. 44.

Genus *Acila* H. and A. ADAMS

2. *Acila (Truncacila) insignis* GOULD
   Reg. Nos. 10759, 18034, three valves; st. 45. Reg. No. 18171, one immature valve; st. 49.

Family **Nuculanidae**

Genus *Nuculana* LINK

3. *Nuculana (Thestyleda) yokoyamai* KURODA[3]
   Reg. No. 18051, one valve; st. 45. Reg. No. 18107, one valve; st. 53.
4. *Nuculana (Jupiteria) confusa* HANLEY
   Reg. No. 18062, one valve; st. 42.
5. *Nuculana (Jupiteria) husamaru* n. sp. Pl. I, figs. 5a, 5b

Shell attains about 16 mm in length, oblong subovate, with many, rather regular concentric ribs which are equal to, or slightly narrower than interspaces; a poorly developed, subsinuos ridge runs from umbo to rostrum behind; area behind ridge somewhat depressed with faint concentric ribs; umbones prominent, unequally descending to both ends, acuminately rounded anteriorly, bluntly pointed, or rostrate posteriorly; ventral margin evenly arcuate in most part but more abrupt in posterior part: lunule narrow, elongate, rather deep, bounded behind by a distinct ridge; escutcheon shallow, flattened with a faint ridge anteriorly; lunule and escutcheon finely striated; hinge-plate well developed, unequally descending with 20 anterior teeth and 17 posterior teeth; pallial impression indistinct.

Shell light brown or straw color, inside more or less nacre shining, dirty white. Length 16.3 mm, height 11 mm, depth of one valve 4.3 mm.

This species appears to be closely related to *Nuculana confusa*

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1) KURODA, T.: The Venus, vol. 1, no. 3, appendix, p. 7, fig. 8, 9, 1921.
2) Register number of the specimen stored in the Saitô Hô-on Kai Museum.
3) KURODA, T.: The Venus, vol. 4, no. 4, p. 214, 1934.

Hanley, mentioned above in general aspects, but is easily distinguished from the latter in having a higher and less elongate shell with more prominent concentric ribs; further the other detail characteristics are considerably different in the two.

Reg. No. 18092, two valves right and left belonging apparently to different individuals; st. 85.

Family **Arcidae**

Genus *Arca* Linné

6. *Arca* (*s.s.*) *boucardi* Jousseaume

Reg. No. 17972, one valve; st. 2. Reg. No. 17966, two valves; st. 6. Reg. No. 18056, one immature valve; st. 45.

7. *Arca* (*s.s.*) *arabica* Philippi

Reg. No. 17890, one valve; st. 47. Reg. No. 18005, five valves; st. 53. Reg. No. 18020, one valve; st. 61. Reg. No. 18160, one valve, not quite typical; st. 77. Reg. No. 18001, three valves; st. 83.

Genus *Barbatia* Gray

8. *Barbatia* (*s.s.*) *decussata* Sowerby

Reg. No. 18022, one valve; st. 83.

9. *Barbatia* (*s.s.*) *stearnsi* Pilsbry

Reg. No. 17914, one valve; st. 83.

10. *Barbatia* (*Acar*) *plicata* Dilwyn

Reg. No. 18083, one valve; st. 48.

Genus *Anadara*, Gray

11. *Anadara* (*s.s.*) *tricenicosta* Nyst

Reg. No. 17904, one valve; st. 58.

12. *Anadara* (*Scapharca*) *nipponensis* Pilsbry

Reg. No. 17915, one immature valve; st. 5. Reg. Nos. 17920, 17922, three imamture valves; st. 17. Reg. No. 17856, one fragmental valve; st. 23. Reg. No. 17875, two valves; st. 38.

Genus *Pseudogrammatodon* Arkell

13. *Pseudogrammatodon dalli* Smith

Reg. No. 17934, one valve; st. 38. Reg. No. 18012, one valve; st. 45. Reg. No. 18054, one valve; st. 53. Reg. No. 17899, one valve; st. 61.

Family **Glycymeridae**

Genus *Glycymeris* Da Costa

14. *Glycymeris yamakawai* YOKOYAMA[1]

Reg. No. 17976, two small valves; st. 53. Reg. No. 17959, two valves; st. 54. Reg. No. 18016, one valve; st. 81.

15. *Glycymeris albolineata* LISCHKE

Reg. No. 17975, one small valve; st. 15. Reg. No. 18013, one small valve; st. 42.

16. *Glycymeris pilsbryi* YOKOYAMA[2]

Reg. Nos. 17973, 18258, eleven valves; st. 83.

Family **Limopsidae**

Genus *Limopsis* SASSO

17. *Limopsis* (*s.s.*) *multistriata* FORSKÅL

Reg. No. 18143, one complete specimen; st. 25. Reg. No. 17971, two valves; st. 38.

18. *Limopsis* (*s.s.*) *azumana* YOKOYAMA[3]

Reg. No. 17911, four valves; st. 85.

19. *Limopsis* (*s.s.*) *s-kinoshitai* KURODA[4]

Reg. No. 21655, one valve; st. 85.

20. *Limopsis* (*Pectunculina*) *crenata* A. ADAMS

Reg. No. 17891, one valve; st. 44. Reg. Nos. 17895, 17919, five valves; st. 45.

21. *Limopsis* (*Empleconia*) *cumingi* A. ADAMS

Reg. No. 18188, one valve; st. 77.

Family **Mytilidae**

Genus *Volsella* SCOPOLLI

22. *Volsella* (*s.s.*) *margaritacea* NOMURA and HATAI[5]

Reg. No. 18210, one complete specimen; st. 23. Reg. No. 18213, one complete specimen; st. 25. Reg. No. 18239, one valve; st. 45, Reg. No. 18212, one complete specimen and one valve; st. 53.

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1) YOKOYAMA, M.: Jour. Coll. Sci., Imp. Univ., Tokyo, vol. 44, art. 1, p. 190, pl. 16, figs. 4, 5, 1922.

2) YOKOYAMA, M.: Jour. Coll. Sci., Imp. Univ., Tokyo, vol. 44, art. 1, p. 190, pl. 16, figs. 8, 9, 1922.

3) YOKOYAMA, M.: *Ibid.*, vol. 39, art. 6, p. 174, pl. 18, figs. 19–21, 1920. (Pliocene and Pleistocene fossil).

4) KURODA, T.: The Venus, vol. 1, no. 4, appendix, p. 15, figs. 24, 25, 1929.

5) NOMURA, S. and HATAI, K.: Saito Ho-on Kai Mus., Res. Bull., no. 19, pl. 4, figs. 2, 3, 1940.

23. *Volsella* (*s.s.*) *traillii* Reeve

Reg. No. 18055, one valve; st. 58. Reg. No. 18159, one valve; st. 61. Reg. No. 18058, one valve; st. 77.

Genus *Septifer* Recluz

24. *Septifer keenae* Nomura[1]

Reg. No. 18147, one valve; st. 61.

Genus *Lithophaga* (Bolten) Röding

25. *Lithophaga* (*Adula*) *californiensis* Philippi

Reg. No. 18002, one complete specimen; st. 23.

Family **Pectinidae**

Genus *Plicatula* Lamarck

26. *Plicatula horrida* Dunker

Reg. No. 17898, one valve; st. 77.

Genus *Chlamys* (Bolten) Röding

27. *Chlamys* (*s.s.*) *irregularis* Sowerby

Reg. No. 18201, one small valve; st. 45. Reg. No. 18260, one valve; st. 48. Reg. No. 18259, one valve; st. 78. Reg. No. 18218, one small valve; st. 85.

28. *Chlamys* (*s.s.*) *squamata* Gmelin

Reg. No. 18040, one fragmental valve; st. 85.

29. *Chlamys* (*Aequipecten*) *vesiculosa* Dunker

Reg. No. 18111, five valves; st. 45. Reg. No. 18110, one complete specimen and one valve; st. 48. Reg. No. 18102, two valves; st. 53. Reg. No. 18255, one valve; st. 54. Reg. No. 18101, one valve; st. 58. Reg. No. 18048, one valve; st. 77. Reg. No. 18106, one valve; st. 78. Reg. No. 18105, one valve; st. 82. Reg. No. 18112, five valves; st. 83. Reg. No. 18226, one fragmental valve; st. 85.

Genus *Propeamusium* Gregorio

30. *Propeamusium* (*Pseudamusium*?) *intuscostatum* Yokoyama[2] var.

Reg. No. 17909, one valve; st. 45.

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1) Nomura, S.: The Venus, vol. 6, no. 4, p. 205, text-figs. 1a–5, 1936 (erroneously printed as *S. keeni*).

2) Yokoyama, M.: Jour. Coll. Sci., Imp. Univ., Tokyo, vol. 39, art. 6, p. 156, pl. 13, figs. 9, 10, 1920 (Pliocene fossil).

The internal lirae are developed only on the marginal portion of the valve.

Genus *Spondylus* Linné

31. *Spondylus anacanthus* Mawe

Reg. No. 10844, one valve; st. 45.

The main ribs are hardly elevated from each other.

Family **Limidae**

Genus *Lima* Bruguiére

32. *Lima* (*s.s.*) *lima* Linné

Reg. No. 17857, one valve; st. 15. Reg. No. 17881, one valve; st. 48. Reg. No. 18014, two valves; st. 83.

33. *Lima* (*s.s.*) *lima zushiensis* Yokoyama[1)]

Reg. No. 21720, one valve; st. 48. Reg. No. 17941, one small valve; st. 61. Reg. No. 17965, two valves st. 77. Reg. No. 17872, two valves; st. 79.

Distinguished from the typical species of *Lima lima* mainly by the greater number of ribs.

34. *Lina* (*s.s.*) *quantoensis* Yokoyama[2)]

Reg. No. 17853, two valves larger than the type; st. 45.

35. *Lima* (*Limatula*) *japonica* A. Adams

Reg. No. 17958, one valve; st. 45.

36. *Lima* (*Ctenoides*) *lischkei* Lamy

Reg. No. 18165, one valve; st. 53. Reg. No. 18168, one valve; st. 58. Reg. No. 18253, three valves; st. 61. Reg. No. 18166, two valves; st. 77. Reg. No. 18248, two valves; st. 83.

37. *Lima* (*Limaria*) *basilanica* Adams and Reeve

Reg. No. 18189, one valve; st. 78.

Family **Anomiidae**

Genus *Anomia* Linné

38. *Anomia cytaeum* Gray

Reg. No. 18227, one upper valve; st. 45. Reg. No. 18231, one upper valve; st. 53. Reg. No. 18074, one upper valve; st. 83.

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1) Yokoyama, M.: *Ibid.*, p. 148, pl. 12, fig. 8, 1920 (Pliocene fossil).

2) Yokoyama, M.: Jour. Coll. Sci., Imp., Univ., Tokyo, vol. 39, art. 6, p. 150, pl. 12, fig. 11, 1920 (Pliocene fossil).

Family **Ostreidae**

Genus *Ostrea* Linné

39. *Ostrea* (*Lopha*) *rosacea* Deshayes
Reg. No. 17862, one valve; st. 77.

40. *Ostrea* (*Crassostrea*) *circumpicta* Pilsbry
Reg. No. 18082, one valve; st. 44.

41. *Ostrea* (*Crassostrea*) *gigas* Thunberg
Reg. No. 17885, one valve; st. 5.

42. *Ostrea* (*Pycnodonta*) *musashiana* Yokoyama[1]
Reg. No. 18098, one valve; st. 10. Reg. No. 17887, twelve valves; st. 55. Reg. No. 18091, one valve; st. 81. Reg. No. 18103, one valve; st. 83. Reg. No. 18043, one valve; st. 85.

Family **Crassatellitidae**

Genus *Crassatellites* Krüger

43. *Crassatellites oblongatus* Yokoyama[2] Pl. I, figs. 6a–7b
Reg. No. 17948, three valves; st. 45.

44. *Cardita* (*s.s.*) *cumingiana* Dunker
Reg. No. 10843, one valve; st. 61. Reg. No. 18138, one valve; st. 77.

45. *Cardita* (*s.s.*) *nodulosa* Lamarck
Reg. No. 18177, one valve; st. 85.

46. *Cardita* (*Venericardia*) *ferruginosa* Adams and Reeve
Reg. No. 17927, one valve; st. 5. Reg. No. 18247, one valve; st. 9. Reg. No. 18039, one complete specimen; st. 51. Reg. Nos. 17996, 18229, one complete specimen and three valves; st. 53. Reg. No. 18060, two valves; st. 77. Reg. No. 18087, three valves; st. 83. Reg. No. 18061, one valve; st. 85.

Family **Isocardiidae**

Genus *Meiocardia* H. and A. Adams

47. *Meiocardia tetragona* Adams and Reeve
Reg. No. 10842, two valves; st. 45.

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1) Yokoyama, M.: Jour. Coll. Sci., Imp. Univ., Tokyo, vol. 39, art. 6, p. 163, pl. 16, figs. 1–5, 1920 (Pliocene and Pleistocene fossil).

2) Yokoyama, M.: *Ibid.*, p. 142, pl. 11, figs. 8, 9, 1920 (Pliocene and Pleistocene fossil).

Family **Codakiidae**

Genus *Lucina* LAMARCK

48. *Lucina* (*Lucinoma*) *acutilineata* CONRAD
Reg. No. 17876, one valve; st. 45.

Family **Ungulinidae**

Genus *Taras* RISSO

49. *Taras* (*Joannisiella*) *cumingi* HANLEY
Reg. Nos. 17866, 18255, two fragmental valves; st. 45.

Family **Erycinidae**

Genus *Kellia* TURTON

50. *Kellia porcula* PILSBRY
Reg. No. 18167, one complete specimen; st. 45.

Family **Montacutidae**

Genus *Montacuta* TURTON

51. *Montacuta* species indet.
Reg. No. 18169, a left valve ornamented with about eight radial threads upon the surface; st. 61. It is too poor for specific determination.

Family **Chamidae**

Genus *Chama* LINNÉ

52. *Chama* (*s.s.*) *reflexa* REEVE
Reg. No. 18045, one valve; st. 45. Reg. Nos. 17945, 18004, 18084, three valves; st. 53. Reg. No. 17913, one valve; st. 61. Reg. No. 18079, one valve; st. 77. Reg. No. 17851, one valve; st. 82.

53. *Chama* (*Pseudochama*) *retroversa* LISCHKE
Reg. No. 17985, one valve; st. 77.

Family **Cardiidae**

Genus *Cardium* LINNÉ

54. *Cardium* (*Clinocardium*) *bülowi* ROLLE
Reg. No. 17939, one small valve; st. 24.

55. *Cardium* (*Acanthocardia*) *exasperatum* SOWERBY
Reg. No. 18186, one valve; st. 78.

Genus *Nemocardium* Meek

56. *Nemocardium samarangae* Makiyama[1)]
Reg. No. 17874, one valve; st. 45.

Family **Veneridae**

Genus *Pitar* Römer

57. *Pitar* (*Pitarina*) *subpellucida* Sowerby?
Reg. No. 18113, one valve; st. 48. Reg. No. 17993, one valve; st. 53. Reg. No. 18123, one valve; st. 83.

Genus *Macrocallista* Meek

58. *Macrocallista* (*Paradione*) *sinensis* Sowerby
Reg. Nos. 17925, 18126, two valves; st. 83.

Genus *Dosinia* Scopoli

59. *Dosinia* (*Austrodosinia*) *histrio* Gmelin
Reg. No. 17868, one valve; st. 77.
60. *Dosinia* (*Pectunculus*) *bruguieri* Gray
Reg. No. 17870, one valve; st. 83.
61. *Dosinia* (*Phacosoma*) *japonica* Reeve
Reg. No. 18003, one valve; st. 53. Reg. No. 17896, one valve; st. 77.
62. *Dosinia* (*Phacosoma*) *pubescens* Philippi
Reg. No. 18010, two valves; st. 83.

Genus *Sunetta* Link

63. *Sunetta* (*Sunettina*) *menstrualis* Menke
Reg. No. 18099, one small valve; st. 10.

Genus *Venus* Linné

64. *Venus* (*s.s.*) *toreuma* Gould
Reg. No. 17871, one valve; st. 77.
65. *Venus* (*Antigona*) *foveolata* Sowerby
Reg. No. 18104, one valve; st. 8. Reg. No. 18100, one valve; st. 54.
66. *Venus* (*Clansinella*) *tiara* Dillwyn
Reg. Nos. 18089, 18121, one complete specimen and one valve; st. 25. Reg. No. 18097, one complete specimen; st. 38. Reg. No. 18071.

1) Makiyama, J.: Mem. Coll. Sci., Kyoto Imp., Univ., ser. B, vol. 10, no. 2 (art. 6), p. 143, 1934 (foot-note).

one fragmental valve; st. 77. Reg. No. 18081, three valves; st. 83

Genus *Gomphina* MÖRCH

67. *Gomphina neastartoides* YOKOYAMA[1]
Reg. No. 17905, one valve; st. 53.

Genus *Protothaca* DALL

68. *Protothaca jedoensis* LISCHKE
Reg. No. 18224, one small valve; st. 53.
69. *Protothaca euglypta* SOWERBY
Reg. No. 17954, one complete small specimen; st. 23. Reg. Nos. 18261, 18263, four valves; st. 45.
70. *Protothaca schencki* NOMURA[2]
Reg. No. 17850, two valves; st. 12. Reg. No. 17888, sixteen valves; st. 23.

Genus *Venerupis* LAMARCK

71. *Venerupis* (*Amygdala*) *philippinarum* ADAMS and REEVE
Reg. No. 17879, one valve; st. 5.

Genus *Irus* OKEN

72. *Irus* (*s.s.*) *mitis* DESHAYES
Reg. No. 17938, one complete specimen; st. 50.

Genus *Petricola* LAMARCK

73. *Petricola* (*s.s.*) *mirabilis* DESHAYES
Reg. No. 17953, one valve; st. 61.

Family **Mactridae**

Genus *Spisula* GRAY

74. *Spisula* (*Mactromeris*) *voyi* GABB
Reg. No. 17877, one valve; st. 45.
75. *Spisula* (*Oxypras*) *bernardi* PILSBRY
Reg. No. 18264, one valve; st. 77. Reg. No. 18114, one valve; st. 83.

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1) YOKOYAMA, M.: Jour. Coll. Sci., Imp. Univ., Tokyo, vol. 44, art. 1, p. 149, pl. 11, figs. 9, 10, 1922 (Pleistocene fossil).

2) NOMURA, S.: Saito Ho-on Kai Mus., Res. Bull., no. 13, p. 8, pl. 3, figs. 2a, 2b, 1937.

Family **Gariidae**

Genus *Gari* Schumacher

76. *Gari* (*s.s.*) *maculosa* Lamarck
Reg. No. 17950, one complete specimen; st. 58.

Family **Tellinidae**

Genus *Arcopagia* T. Brown

77. *Arcopagia* (*Merisca*) *ojiensis* Tokunaga[1]
Reg. No. 17931, one valve; st. 83.

78. *Arcopagia* (*Merisca*) *serricostata* Tokunaga[2]
Reg. No. 17969, one valve; st. 44. Reg. No. 18023, six valves; st. 53. Reg. No. 17974, one valve; st. 82. Reg. No. 17943, one valve; st. 83.

79. *Tellina* (*Peranidia*) *kesenensis* Nomura and Hatai[3]
Reg. No. 17926, one complete specimen; st. 25.

80. *Tellina* (*Fabulina*) *nitidula* Dunker
Reg. No. 17929, one valve; st. 25.

81. *Tellina* (*Moerella*) *jedoensis* Lischke
Reg. No. 17928, one valve; st. 42.

Genus *Macoma* Leach

82. *Macoma* (*s.s.*) *transculpta* Sowerby
Reg. No. 18237, two valves; st. 44. Reg. No. 18181, one valve; st. 53.

83. *Macoma* (*s.s.*) *nipponica* Tokunaga[4]
Reg. No. 17960, one valve; st. 45.

84. *Macoma* (*Psammacoma*) *awajiensis* Pilsbry
Reg. No. 18211, one valve; st. 51. Reg. No. 18196, one valve; st. 83.

Genus *Gastrana* Schumcher

85. *Gastrana japonica* v. Martens
Reg. No. 17858, two valves; st. 23.

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1) Tokunaga, S.: Jour. Coll. Sci., Imp. Univ., Tokyo, vol. 21, art. 2, p. 44, pl. 2, figs. 34a, b, 1906 (Pleistocene fossil).

2) Tokunaga, S.: *Ibid.*, p. 43, pl. 2, figs. 32a, b, 1906 (Pleistocene fossil).

3) Nomura, S. and Hatai, K.: Saito Ho-on Kai Mus., Res. Bull., no. 5, p. 14, pl. 1, figs. 1a, b, 1935.

4) Tokunaga, S.: Jour. Coll. Sci., Imp. Univ., Tokyo, vol. 21, art. 2, p. 44, pl. 2, figs. 36a, b, 1906 (Pleistocene fossil).

86. *Gastrana yantaiensis* Crosse and Debeaux
Reg. No. 19015, one valve; st. 61.

Family **Solenidae**

Genus *Solen* Linné

87. *Solen grandis* Dunker?
Reg. No. 17878, one fragmental valve; st. 77.
88. *Solen krusensterni* Schrenck
Reg. No. 17884, one valve; st. 12.
89. *Solen gordonis* Yokoyama?
Reg. No. 17852, one valve; st. 61. Reg. No. 17979, one valve; st. 77.

Family **Hiatellidae**

Genus *Hiatella* Bosc

90. *Hiatella arctica* Linné
Reg. No. 18184, one valve; st. 53. Reg. No. 18214, three valves; st. 85.

Family **Erodonidae**

Genus *Aloides* Megerle

91. *Aloides* (*s.s.*) *venustus* Gould
Reg. No. 18072, one valve; st. 61.
92. *Aloides* (*s.s.*) *scaphoides* Hinds
Reg. No. 18064, one valve; st. 78.

Genus *Erodona* Bosc

93. *Erodona frequens* Yokoyama[1)]
Reg. No. 18191, one valve; st. 77.

Family **Pholadidae**

Genus *Barnea* Risso

94. *Barnea* (*Anchomasa*) *fragilis* Sowerby
Reg. No. 18008, four valves; st. 23.

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1) Yokoyama, M.: Jour. Coll. Sci., Imp. Univ., Tokyo, vol. 44, art. 1, p. 121, pl. 6, figs. 16, 17, 1922 (Pleistocene fossil).

Family **Lyonsiidae**

Genus *Lyonsia* Turton

95. *Lyonsia* (*s.s.*) *ventricosa* Gould
Reg. No. 18225, one complete specimen; st. 23.

96. *Lyonsia* (*Entodesma*) *navicula* Adams and Reeve
Reg. No. 18182, two valves; st. 12. Reg. No. 17893, one small complete specimen; st. 45.

Family **Calopodiidae**

Genus *Calopodium* (Bolten) Röding

97. *Calopodium* (*Kennerlia*) *japonicum* Nomura and Hatai[1)]
Reg. No. 18252, one valve; st. 9. Reg. No. 17897, one complete specimen; st. 25.

Family **Myochamidae**

Genus *Myadora* Gray

98. *Myadora fluctuosa* Gould
Reg. No. 17937, one valve; st. 53.

Family **Pholadomyidae**

Genus *Pholadomya* Sowerby

99. *Pholadomya pacifica* Dall. Pl. I, figs. 8a, 8b
Reg. No. 17855, one valve; st. 45.

Family **Poromyidae**

Genus *Poromya* Forbes

100. *Poromya* (*s.s.*) *flexuosa* Yokoyama
Reg. No. 18053, one valve; st. 45. Reg. No. 18176, one valve; st. 85.

Family **Cuspidariidae**

Genus *Cuspidaria* Nardo

101. *Cuspidaria* (*s.s.*) *chinensis* Griffith and Pidgeon

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1) Nomura, S. and Hatai, K.: Saito Ho-on Kai Mus., Res. Bull., no. 19, pl. 4, figs. 13a–14b, 1940.

2) Yokoyama, M.: Jour. Coll. Sci., Imp. Univ., Tokyo, vol. 44, art. 1, p. 173, pl. 14, figs. 15, 16, 1922 (Pleistocene fossil).

Reg. No. 18222, one valve; st. 25. Reg. No. 18185, one valve; st. 45. Reg. No. 18220, one valve; st. 82. Reg. No. 18187, one valve; st. 85.

102. *Cuspidaria* (*s.s.*) *suganumai* n. sp. Pl. I, figs. 13a, 13b

Cuspidaria suganumai n. sp. is closely allied to *Cuspidaria chinensis* mentioned above, but the valve appears slightly more convex and umbo is more swollen. The upper margin of rostrum is perhaps less arched. The surface sculpture is decidedly finer, and not so distinct as in *chinensis*.

Length 20 mm, height 13 mm, convexity 5 mm (a right valve).

The specific name is given in honor of Mr. K. SUGANUMA, Director of the Tiba Fisheries Experimental Station at Hôzyô-Tateyama-mati.

Reg. No. 17957, one right valve; st. 53.

SCAPHOPODA

Family **Dentaliidae**

Genus *Dentalium* LINNÉ

103. *Dentalium* (*s.s.*) *habutae* KURODA and KIKUCHI[1)]

Reg. No. 18059, one specimen; st. 53.

104. *Dentalium* (*Antalis*) *rhabdotum* PILSBRY

Reg. No. 18136, one specimen; st. 85.

105. *Dentalium* (*Antalis*) *weinkauffi* DUNKER

Reg. No. 10847, one specimen; st. 5. Reg. No. 19846, one specimen; st. 14. Reg. Nos. 18066, 18120, 18135, six fragmental specimens; st. 25. Reg. No. 17977, one specimen; st. 38. Reg. No. 18046, one fragmental specimen; st. 44. Reg. No. 18095, one specimen; st. 53. Reg. No. 17930, four specimens; st. 81. Reg. No. 18132, one specimen, st. 85.

106. *Dentalium* (*Antalis*) *pretiosum* SOWERBY

Reg. No. 18075, one specimen; st. 83.

107. *Dentalium* (*Antalis*) *tibanum* n. sp. Pl. I, figs. 11a, 11b

Shell medium-sized, thin, rather rapidly enlarging, moderately curved; anterior opening circular, posterior longly ovate; surface marked by numerous fine growth lines and many axial threads that are confined on posterior part of shell; anal notch shallow and rather broad with a very short, not much projecting pipe at tip.

Length 35.5 mm, diameter of aperture 5 mm, of apex —1 mm.

The shell is much shorter and axial threads finer than *D. weinkauffi*

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1) KURODA, T. and KIKUCHI, K.: The Venus, vol. 4, no. 1, p. 8, pl. 1, figs. 12, 13, text-figs. 3, 4, 1933.

Dunker mentioned above.

Reg. No. 17981, ten specimens; st. 15.

108. *Dentalium* (*Fissidentalium*) *hungerfordi* Pilsbry and Sharp

Reg. Nos. 10760, 17982, three specimens; st. 45.

109. *Dentalium* (*Fustiaria*) *nipponicum* Yokoyama[1)]

Reg. No. 18140, one specimen; st. 25. Reg. No. 17987, one specimen; st. 54.

110. *Dentalium* (*Laevidentalium*) *lubricatum* Sowerby?

Reg. No. 18124, one specimen; st. 45. Reg. No. 18057, one specimen; st. 85.

GASTROPODA

Family **Fissurellidae**

Genus *Emaginula* Lamarck

111. *Emarginula* (*s.s.*) *foveolata* Schepman

Reg. No. 18041, two specimens; st. 45. Reg. No. 18122, one fragmental specimen; st. 85.

Genus *Puncturella* Lowe

112. *Puncturella fastigiata* A. Adams

Reg. No. 18202, one specimen; st. 44. Reg. No. 18096, one specimen; st. 53.

Family **Patellidae**

Genus *Cellana* A. Adams

113. *Cellana toreuma* Reeve

Reg. No. 17868, one specimen; st. 53.

Family **Acmaeidae**

Genus *Acmaea* Eschscholtz

114. *Acmaea pallida* Gould

Reg. No. 17963, one specimen; st. 45.

115. *Acmaea* (*Collisellina*) *saccharina* Linné

Reg. No. 18049, one specimen; st. 53.

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1) Yokoyama, M.: Jour. Coll. Sci., Imp. Univ., Tokyo, vol. 44, art. 1, p. 119, pl. 6, fig. 7, 1922 (Pleistocene fossil).

Family **Trochidae**

Genus *Turcica* H. and A. Adams

116. *Turcica imperialis* A. Adams

Reg. No. 18198, one small specimen; st. 53. Reg. No. 18030, one specimen; st. 81.

Genus *Lischkeia* Fischer

117. *Lischkeia* (*Turcicula*) *crumpii* Pilsbry

Reg. No. 18208, one specimen; st. 44.

Genus *Solariella* S. Wood

118. *Solariella sakya* Yokoyama[1)]

Reg. No. 18221, one specimen; st. 45. Reg. Nos. 18194, 19219, two specimens; st. 53. Reg. No. 18223, one specimen; st. 54. Reg. No. 18216, one specimen; st. 81. Reg. No. 18200, one specimen; st. 85.

119. *Solariella stearnsi* Pilsbry

Reg. No. 18199, one specimen; st. 45.

Genus *Calliostoma* Swainson

120. *Calliostoma* (*s.s.*) *unicum* Dunker

Reg. No. 18154, one specimen; st. 23. Reg. No. 18000, one specimen; st. 50. Reg. No. 18116, one specimen; st. 42.

121. *Calliostoma* (*s.s.*) *aculeatum* Sowerby

Reg. No. 18035, one specimen; st. 15. Reg. No. 18031, two specimens; st. 53. Reg. No. 18086, one specimen; st. 78.

122. *Calliostoma* (*s.s.*) *hungerfordi* Sowerby

Reg. No. 18153, two specimens; st. 23. Reg. No. 18994, three specimens; st. 24. Reg. No. 18032, one specimen; st. 42.

123. *Calliostoma* (*s.s.*) *multiliratum* Sowerby

Reg. Nos. 17991, 18174, two small specimens; st. 85.

Genus *Enida* A. Adams

124. *Enida japonica* A. Adams

Reg. Nos. 17907, 17949, three specimens; st. 53.

125. *Tibatrochus husaensis* n. gen. and n. sp. Pl. I, figs. 10a, 10b

Shell small, solid, conical, imperforate; nucleus consisting of one small, smooth whorl; post-nuclear whorls six, separated by deep, marked sutures making whorls

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1) Yokoyama, M.: Jour. Fac. Sci., Imp. Univ., Tokyo, sec. 2, vol. 3, pt. 4, p. 202, pl. 12, fig. 9, 1931 (Miocene fossil).

overhanging; periphery of last whorl roundly angulated; columella substraight, somewhat thickened in middle, smooth, coated by very thin callus; aperture more or less angular-ovate, smooth, nacreous; outer and basal lips thin marginally, thickened internally; sculpture of each post-nuclear whorl with three revolving cords, beaded by prominent retractive axials; of three spirals upper one defined upper shoulder and lower one bound by lower suture; base of last whorl plano-convex with six narrow revolving threads, separated by broader interspaces; entire surface also covered with very fine growth-lines.

Height 7 mm, diameter 5.6 mm.

This species resembles the members of *Euchelus* in certain respects, but differs by having different surface sculpture and no transverse lirae within the aperture. It is also allied to the members of *Turcicula* and *Calliostoma,* but is much smaller with distinct oblique axial cords upon the surface. I propose the new generic name *Tibatrochus* with the present new species as the type. It is unfortunate that the operculum is unknown at present.

Reg. Nos. 18170, 18190, two specimens; st. 45.

Genus *Umbonium* Link

126. *Umbonium* (*Suchium*) *moniliferum* Lamarck

Reg. No. 17908, one specimen; st. 30.

127. *Umbonium* (*Suchium*) *moniliferum costatum* Kiener

Reg. No. 18065, one specimen; st. 2. Reg. No. 17864, two specimens; st. 23. Reg. No. 17992, two specimens; st. 42. Reg. No. 18050, one specimen; st. 50.

Family **Turbinidae**

Genus *Liotia* Gray

128. *Liotia* (*Arene*) *crenata* Kiener?

Reg. Nos. 18192, 18235, three specimens; st. 45.

Genus *Turbo* Linné

129. *Turbo* (*Batillus*) *coronatus* Solander

Reg. No. 17865, one small specimen; st. 50.

Genus *Astraea* (Bolten) Röding

130. *Astraea* (*Bolma*) *modesta* Reeve

Reg. No. 18234, one specimen; st. 82.

131. *Astraea* (*Bolma*) *modesta girgylla* Reeve

Reg. No. 17880, one specimen; st. 79.

Genus *Homalopoma* Carpenter

132. *Homalopoma granuliferum* Nomura and Hatai[1]

Reg. No. 17961, one specimen; st. 44. Reg. Nos. 17900, 17901, 17952, four specimens; st. 45. Reg. No. 17946, two specimens; st. 53. Reg. No. 17921, one specimen; st. 54. Reg. No. 17892, one specimen; st. 82.

Family **Turritellidae**

Genus *Turritella* Lamarck

133. *Turritella* (*Haustator*) *tibana* n. sp. Pl. I, fig. 12

Shell resembling *Turritella* (*Haustator*) *nipponica* Yokoyama[2] from the Pliocene and Pleistocene of the Kwantô region but the ribs are less prominent and bipartite upon aged whorls. The whorls are proportionally narrower, or in other words they are more slowly enlarging. The ribs are five in each lower whorl, the upper two close to upper suture and smaller than the others.

Height +34 mm, diameter of last whorl 10.2 mm.

The form of the present new species appears very similar to "*Turritella fortilirata* n. subsp." mentioned by Otuka[3] but it was left undescribed.

Reg. No. 18024, two specimens; st. 45.

Family **Mathildae**

Genus *Mathilda* Semper

134. *Mathilda sinensis* Fischer

Reg. No. 18164, one specimen; st. 44.

Family **Architectonicidae**

Genus *Architectonica* (Bolten) Röding

135. *Architectonica* (*s.s.*) *perspectiva* Linné

Reg. No. 18265, one specimen; st. 54.

Family **Vermiculariidae**

Genus *Lemintina* Risso

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1) Nomura, S. and Hatai, K.: Saito Ho-on Kai Mus., Res. Bull., no. 19, pl. 3, figs. 3a, 3b, 1940.

2) Yokoyama, M.: Jour. Coll. Sci., Imp. Univ., Tokyo, vol. 39, art. 6, p. 71, pl. 4, figs. 16–19, 1920 (Pliocene and Pleistocene fossil).

3) Otuka, Y.: The Venus, vol. 8, no. 1, p. 43, fig. 3, 1938.

136. *Lemintina dentiferas* Lamarck?

Reg. No. 19845, one specimen; st. 45.

Fine axial threads crossed by growth-lines to make the surface minutely granular.

Family **Potamidae**

Genus *Batillaria* Benson

137. *Batillaria* (*s.s.*) *zonalis* Bruguiére

Reg. No. 17889, one specimen; st. 30. Reg. No. 18215, one specimen; st. 31.

Genus *Cerithium* Bruguiére

138. *Cerithium* (*Proclava*) *kochi* Philippi

Reg. No. 18026, three specimens; st. 50.

Family **Epitoniidae**

Genus *Epitonium* (Bolten) Röding

139. *Epitonium* (*Viciniscala*) *neglectum* Adams and Reeve

Reg. No. 18209, one specimen; st. 44. Reg. No. 17963, one specimen; st. 85.

140. *Epitonium* (*Turbiniscala*) *pyramidale* Sowerby

Reg. No. 17968, one specimen; st. 42.

141. *Epitonium* (*Lineoscala*) *lyrum* Sowerby

Reg. No. 18228, one specimen; st. 25.

142. *Epitonium* (*Decussiscala*) *castum* Sowerby?

Reg. No. 18175, two imperfect specimens; st. 85.

143. *Epitonium* (*Cinctiscala*) *sagamienes* Pilsbry

Reg. No. 18236, one specimen; st. 45.

Genus *Cirsotrema* Mörch

144. *Cirsotrema* (*Arcilla*) *ojiense* Yokoyama?

Reg. No. 18206, one specimen; st. 45.

145. *Cirsotrema* (*Amaea*) *magnificum* Sowerby

Reg. No. 18127, one specimen; st. 15.

Family **Cheileidae**

Genus *Hipponyx* Defrance

146. *Hipponyx* (*s.s.*) *conicus* Schumacher

Reg. No. 18069, two specimens; st. 83.

Family **Naticidae**

Genus *Natica* Scopoli

147. *Natica* (*Tectonatica*) *janthostoma* Deshayes
Reg. No. 17998, one specimen; st. 17.
148. *Natica* (*s.s.*) *vitella* Linné
Reg. No. 17869, one specimen; st. 54.

Genus *Polinices* Montfort

149. *Polinices* (*s.s.*) *flemigianus* Recluz var.
Reg. No. 18007, one specimen; st. 45.
150. *Polinices* (*Neverita*) *didymus* (Bolten) Röding
Reg. No. 18145, one small specimen; st. 30. Reg. No. 18006, one small specimen; st. 31.
151. *Polinices* (*Euspira*) *pallidus* Broderip and Sowerby
Reg. No. 17918, two small specimens questionably referred to the named species; st. 44.

Family **Cypraeidae**

Genus *Simnia* Risso

152. *Simnia* (*Neosomnia*) *hirasei* Pilsbry
Reg. No. 17910, one specimen; st. 45.
153. *Cypraea* (*Erronea*) *japonica* Schilder
Reg. No. 18148, one specimen; st. 47.
154. *Cypraea* (*Pustularia*) *nucleus* Linné
Reg. No. 18077, one specimen; st. 50.
155. *Cypraea* (*Erosaria*) *helvola* Linné
Reg. No. 18152, one specimen; st. 50.

Family **Cymatiidae**

Genus *Argobuccinum* Bruguiére

156. *Argobuccinum* (*Biplex*) *percum* Perry
Reg. No. 10761, one specimen; st. 83. Reg. No. 10762, one specimen; st. 85.

Genus *Cymatium* (Bolten) Röding

157. *Cymatium* (*s.s.*) *tenuiliratum* Lischke
Reg. No. 18019, one specimen; st. 23.
158. *Cymatium* (*Septa*) *aquatile* Reeve

Reg. No. 17861, one specimen; st. 45.

159. *Cymatium* (*Cabestana*) *kiiense* Sowerby
Reg. No. 18027, one specimen; st. 23.

Genus *Distorsio* (Bolten) Röding

160. *Distorsio reticulata* (Bolten) Röding
Reg. No. 18009, one specimen; st. 45.

Family **Bursidae**

Genus *Bursa* (Bolten) Röding

161. *Bursa* (*Butonariella*) *ranelloides* Reeve
Reg. No. 18262, one specimen; st. 45. Reg. No. 18266, one specimen; st. 48.

Family **Muricidae**

Genus *Murex* Linné

162. *Murex* (*Poirieria*) *azami* Kuroda[1)]
Reg. No. 17903, one immature specimen; st. 53. Reg. No. 18172, one immature specimen; st. 85.

Genus *Tritonalia* Fleming

163. *Tritonalia* (*s.s.*) *adunca* Sowerby
Reg. No. 17967, one immature specimen; st. 23. Reg. No. 18203, one specimen; st. 44.

164. *Tritonalia* (*Ceratostoma*) *fournieri* Crosse
Reg. No. 18232, one specimen; st. 47.

165. *Tritonalia* (*Ceratostoma*) *plorator* Adams and Reeve
Reg. No. 18238, two specimens; st. 85.

166. *Tritonalia*? species indet.
Reg. No. 18173, one immature specimen; st. 30.

Genus *Urosalpinx* Stimpson

167. *Urosalpinx pachyrhaphe* Smith
Reg. No. 18243, one specimen; st. 85.

Genus *Typhis* Montfort

168. *Typhis* (*Cyhonochellus*) *arcuata* Hinds
Reg. No. 18094, one specimen; st. 85.

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1) Kuroda, T.: The Venus, vol. 1, no. 2, p. 95, pl. 3, fig. 13, 1929.

Genus *Thais* (Bolten) Röding

169. *Thais* (*Mancinella*) *bronni* Dunker

Reg. No. 17895, two specimens; st. 12. Reg. No. 17883, one specimen; st. 17.

170. *Thais* (*Mancinella*) *luteostoma* Dillwyn

Reg. No. 17873, one specimen; st. 12. Reg. No. 21859, one specimen; st. 17.

Genus *Nucella* (Bolten) Röding

171. *Nucella lima* "Martyn"

Reg. No. 17970, one specimen; st. 12.

172. *Nucella freycincti* Deshayes

Reg. No. 17951, one specimen; st. 30. Reg. No. 17962, one specimen; st. 31. Reg. No. 18246, one specimen; st. 45.

Family **Pyrenidae**

Genus *Pyrene* (Bolten) Röding

173. *Pyrene* (*Mitrella*) *varians* Dunker

Reg. No. 18131, one specimen; st. 17. Reg. No. 18158, one specimen; st. 30. Reg. No. 18137, one specimen; st. 38.

174. *Pyrene* (*Mitrella*) *bicinctella* Yokoyama[1)]

Reg. No. 18241, one specimen; st. 44.

175. *Pyrene* (*Anachis*) *impolita* Sowerby

Reg. No. 18078, one specimen; st. 30.

Family **Buccinidae**

Genus *Microfusus* Dall

176. *Microfusus lischkei* Kuroda[2)]

Reg. No. 17916, one specimen; st. 53.

177. *Microfusus magnificus* Lischke

Reg. No. 18161, one specimen; st. 85.

Genus *Siphonalia* A. Adams

178. *Siphonalia spadicea* Reeve

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1) Yokoyama, M.: Jour. Fac. Sci., Imp. Univ., Tokyo, sec. 2, vol. 2, p. 245, pl. 47, fig. 6, 1928 (Pliocene fossil).

2) Kuroda, T. and Makiyama, J.: Mem. Coll. Sci., Kyoto Imp. Univ., ser. B, vol. 3, no. 1, art. 1, p. 121, 1927.

Reg. No. 18070, one specimen; st. 44. Reg. Nos. 18128, 18230, 18134, 18150, four specimens; st. 53. Reg. No. 18052, one specimen; st. 78. Reg. No. 18195, one specimen; st. 85.

179. *Siphonalia stearnsi* Pilsbry

Reg. No. 17863, one specimen; st. 25. Reg. No. 18038, two specimens; st. 54.

180. *Siphonalia cassidariaeformis* Reeve

Reg. No. 10851, two specimens; st. 14. Reg. No. 18017, one immature specimen; st. 27. Reg. No. 18068, two specimens; st. 30. Reg. No. 18067, one specimen; st. 51. Reg. No. 17984, one specimen; st. 54.

181. *Siphonalia fusoides* Reeve?

Reg. No. 18205, one small specimen; st. 30.

Genus *Searlesia* Harmer

182. *Searlesia fuscolabiata* Smith

Reg. No. 18151, three specimens; st. 23.

Genus *Neptunea* (Bolten) Röding

183. *Neptunea* (*Barbitonia*) *arthritica* Valenciennes

Reg. Nos. 17988, 18244, three small specimens; st. 12. Reg. No. 17989, one specimen; st. 28.

Genus *Babylonia* Schlüter

184. *Babylonia japonica* Reeve

Reg. No. 17822, one specimen; st. 26.

Genus *Cantharus* (Bolten) Röding

185. *Cantharus* (*Pollia*) *undulatus* Schepman

Reg. No. 17932, four specimens; st. 24. Reg. No. 17942, one specimen; st. 31. Reg. No. 18021, one specimen; st. 38. Reg. No. 18179, one specimen; st. 73.

186. *Cantharus* (*Pollia*) *subrubiginosus* Smith

Reg. No. 17956, one specimen; st. 17. Reg. No. 18250, one specimen; st. 38.

Genus *Colus* (Bolten) Röding

187. *Colus* (*Aulacofusus*) *mitrellaformis* n. sp. Pl. I, figs. 1a, 1b

Shell small, fusiform, somewhat *mitrella*-like; whorls about eight (nuclear whorls lost), slightly convex; sutures distinct; surface sculptured with many equally spaced spiral threads; spirals ten, appear on penultimate whorl, separated by narrower grooves, uppermost thread close to upper suture and minutely crenulated;

growth-lines rather marked, somewhat flexuose; last whorl large, longer than spire with broadly rounded periphery; base rather abruptly contracted; canal nearly straight; aperture fusiform, pointed behind; inner lip smooth with a thin callus, outer lip fractured, but many have been thin.

Height ca. 18.4 mm, diameter 7.25 mm.

The crenulate nature in front of the upper suture of this species is parhaps characteristic.

Reg. No. 18157, one dead, straw colored specimen; st. 53.

Family **Nassariidae**

Genus *Nassarius* Froriep

188. *Nassarius* (*Niotha*) *gemmulatus* Lamarck

Reg. No. 18011, one specimen; st. 39. Reg. No. 17917, one specimen; st. 78.

189. *Nassarius* (*Niotha*) *livescens* Philippi

Reg. No. 17964, one specimen; st. 30.

190. *Nassarius* (*Alectrion*) *balteatus* Lischke

Reg. No. 18119, one specimen; st. 25. Reg. No. 18139, one specimen; st. 38.

191. *Nassarius* (*Tritonella*) *fraterculus* Dunker

Reg. No. 17923, two specimens; st. 31.

192. *Nassarius* (*Zeuxis*) *variciferus* A. Adams

Reg. No. 18073, three specimens; st. 45. Reg. No. 18233, one specimen; st. 78. Reg. No. 18036, one specimen; st. 85.

Family **Fasciolariidae**

Genus *Fusinus* Rafinesque

193. *Fusinus graciliformis* A. Adams

Reg. Nos. 18180, 18251, two specimens; st. 45. Reg. No. 18249, one specimen; st. 82.

194. *Fusinus nipponicus* Smith

Reg. No. 18029, one specimen; st. 3. Reg. No. 18163, four specimens; st. 10. Reg. No. 18033, four specimens; st. 44. Reg. No. 17995, one specimen; st. 45. Reg. No. 18155, two specimens; st. 54. Reg. No. 18117, two specimens; st. 78. Reg. No. 18025, one specimen; st. 81. Reg. No. 18118, two specimens; st. 82. Reg. No. 17999, seven specimens; st. 85.

Genus *Peristernia* Mörch

195. *Persternia coreanica* Smith

Reg. No. 18193, one specimen; st. 85.

Family **Olividae**

Genus *Olivella* Swainson

196. *Olivella fortunei* Adams and Reeve

Reg. No. 18156, two specimens; st. 12. Reg. No. 18129, one specimen; it agrees with the variety "*japonica*" Pilsbry; st. 44.

Family **Mitridae**

Genus *Mitra* Lamarck

197. *Mitra* (*Nebularia*) *hanleyana* Dunker

Reg. No. 17947, one specimen; st. 45.

Family **Volutidae**

Genus *Fulgolaria* Schumacher

198. *Fulgolaria* (*Psephaea*) *concinna* Broderip?

Reg. Nos. 18141, 18149, two small specimens; st. 45.

Family **Turridae**

Genus *Clavatula* Lamarck

199. *Clavatula patruelis* Smith

Reg. No. 18162, one specimen; st. 25, Reg. No. 17933, one specimen; st. 25. Reg. No. 17912, one specimen; st. 44. Reg. No. 18242, one specimen; st. 45. Reg. Nos. 17924, 17940, two specimens; st. 53. Reg. No. 17955, one specimen; st. 78.

Genus *Turris* O. H. Müller

200. *Turris* (*s.s.*) *unedo* Kiener

Reg. No. 17986, one specimen; st. 53. Reg. No. 17980, one specimen; st. 85.

201. *Turris* (*s.s.*) *leucotropis* Adams and Reeve

Reg. No. 18108, one specimen; st. 39.

202. *Turris* (*Gemmula*) *granosa* Helbling

Reg. No. 18183, one specimen; st. 10. Reg. No. 17860, two specimens; st. 82. Reg. No. 17854, two specimens; st. 85.

203. *Turris* (*Gemmula*) *pseudogranosa* n. sp. Pl. I, figs. 2a, 2b

Reg. No. 21860, two specimens; st. 3.

Shell nearly similar to *T. granosa* mentioned above in sculpture, but is smaller and narrower with a shorter and recurved canal.

Height ca. 20 mm, diameter 6.1 mm.

204. *Turris* (*Gemmula*) *husamaru* n. sp. Pl. I, figs. 4a, 4b

Shell rather small, relatively stout, short-fusiform; whorls about twelve, of which upper two are nuclear, smooth and globose; rest sculptured with a prominent, granular band close to lower suture, and two or three more or less crenulate threads above it in each whorl. There are also one or two finer threads in interspaces; periphery of last whorl rounded; base convex, narrowed abruptly into canal; base and canal encircled by many more or less crenulate threads, occassionally intercalated with finer one between them; canal rather short; sinus large, situated upon main series of granules which forms angle of whorl. Color white, encircles light brown band below suture.

Height ca. 19 mm, diameter 8 mm.

Distinguishable from *Turris pseudogranosa* n. sp. by that the whorls are shorter and broader with a less number of finer threads upon the surface. It is also easily distinguished from *Turris granosa*, by the shorter canal.

Reg. No. 18217, two specimens; st. 3. Reg. No. 18257, one specimen; st. 9.

Genus *Brachytoma* Swainson

205. *Brachytoma varicosa* Reeve

Reg. No. 17894, one specimen; st. 85.

206. *Brachytoma jeffreysi* Smith

Reg. No. 18133, one specimen; st. 25. Reg. No. 18018, two specimens; st. 26. Reg. No. 18142, one specimen; st. 27. Reg. No. 18093, one specimen; st. 38.

207. *Brachytoma japonica* Lischke

Reg. No. 18085, one specimen; st. 23. Reg. No. 19080, one specimen; st. 30. Reg. No. 18076, one specimen; st. 42.

Genus *Lienardia* Jousseaume

208. *Lienardia* (*Etrema*) *fortilirata* Smith

Reg. No. 18204, one specimen; st. 31.

Genus *Mangelia* Risso

209. *Mangelia subgracilenta* n. sp. Pl. I, figs, 14a, 14b

Shell resembling *Mangelia gracilenta* Reeve from Japan and the Philippines, small, fusiform, moderately stout; whorls, about eight (nuclear ones lost) angulate in middle with surface above angle a little concave, sloping, below nearly vertical; surface sculptured with axial ribs and nearly equal, or somewhat broader inter-

spaces, obtuse, or almost vanish on anterior end; spirals three on upper whorl, four on penultimate whorl below middle, uppermost one forms angle of whorl; besides there is a submarginal, rather prominent cord on each whorl; entire surface finely reticulate by crossing of many minute spiral striae and growth-lines; body-whorl nearly equal to spire in length; periphery of last whorl well-rounded, passing gradually into convex base which is sculptured with about fifteen main spirals and smaller interstitial threads; aperture elongated with a recurved canal below; inner lip nearly smooth by deposit of thin callus; outer lip partly gractured, but posterior sinus seems to have been shallow and broad, situated at concave area above angle.

Height ca. 9.2 mm, diameter 3.15 mm.

This species may be distinguished from *Mangelia gracilenta* REEVE mainly by the whorls which are more angular.

Mangelia oyuana YOKOYAMA[1] is also related to the present new species, but the former has the inner lip denticulate instead of smooth as in this new species.

Reg. No. 18207, one dead, straw colored specimen; st. 85.

Genus *Lora* GISTEL

210. *Lora kazusensis* n. sp. Pl. I, figs. 9a, 9b

Shell smaller and broader than preceeding species; nuclear whorls two, apparently smooth, globular, suceeding two whorls strongly convex around middle with many fine axial striae; rest angular in middle, concave above angle, vertical below; sculpture consists of axial, node-like ribs and spiral threads; ribs about thirteen on penultimate whorl, slightly oblique, generally narrower than interspaces, almost obsolete on area above angle and last whorl; spirals rather irregular in strength, two or three prominent ones appear on a whorl associated with finer ones between them, but no spirals on area above angle; last whorl nearly equal to spire in length with many flexuose, fine spiral threads and crossing growth-lines thus making surface reticulate in appearance; periphery of last whorl well-rounded; base convex, constricted below; canal short, recurved; inner lip smooth, covered by a rather thick callus, with a nerrow fasciole below; aperture elongate; outer lip fractured, but posterior sinus appears broad and shallow, situated at concave area as judged by curvature of growth-lines.

Height 8.2 mm, diameter 3.4 mm.

"Bela" sattava YOKOYAMA[2] is perhaps most related to the present new species, but differs by the surface sculpture.

Reg. No. 18178, one dead straw colored specimen; st. 44.

211. *Lora suganumana* n. sp. Pl. I, figs. 3a, 3b

Shell small, rather thin, rather broad-fusiform; whorls seven, apical one or

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1) YOKOYAMA, M.: Jour. Coll. Sci., Imp. Univ., Tokyo, vol. 44, art. 1, p. 43, pl. 1, fig. 36, 1922 (Pleistocene fossil).

2) YOKOYAMA, M.: Jour. Fac. Sci., Imp. Univ., Tokyo, sec. 2, vol. 1, pt. 8, p. 260, pl. 32, fig. 5, 1926 (Pliocene fossil).

one half nuclear, smooth, depressed-globose; rest convex, somewhat angular above with fifteen prominent flexuose, rounded axial ribs extending from upper to lower sutures; interspaces, smooth, generally broader than ribs; last whorl higher than spire with well rounded periphery; base sculptured like space between sutures, but axial ribs become fainter towards very base where there are about four, more or less indistinct spiral threads around it; aperture longly-ovate, angular posteriorly canal short, somewhat recurved; inner lip smooth with a thin callus, outer lip thickened by terminal varix, smooth within; posterior sinus very slight.

Height 12 mm, diameter 4.8 mm.

"Bela" kagana YOKOYAMA[1] perhaps belongs to the same group as the present species, but is not specifically identical. YOKOYAMA's species has the ribs less flexuose than this new species.

Reg. No. 18197, one, dead specimen; st. 45.

Family **Conidae**

Genus *Conus* LINNÉ

212. *Conus sieboldi* REEVE

Reg. Nos. 18240, 18267, six specimens; st. 45. Reg. No. 18245, one specimen; st. 85.

Family **Terebridae**

Genus *Terebra* BRUGUIÉRE

213. *Terebra* (*Pervicacia*) *bifrons* HINDS

Reg. No. 18037, two specimens; st. 2. Reg. No. 18088, one specimen; st. 6. Reg. No. 18130, one specimen; st. 25. Reg. No. 17983, two specimens; st. 26. Reg. No. 18063, two specimens; st. 31. Reg. No. 17990, one specimen; st. 42.

214. *Terebra* (*Pervicacia*) *evoluta* DESHAYES

Reg. No. 18115, one specimen; st. 44.

215. *Terebra* (*Punctoterebra*) *awajiensis* PILSBRY

Reg. No. 17987, one specimen; st. 51.

216. *Terebra* (*Punctoterebra*) *lischkeana* DUNKER

Reg. No. 18047, two specimens, st. 25.

217. *Terebra* (*Strioterebrum*) *loebeckeana* DUNKER

Reg. No. 18125, five specimens; st. 25. Reg. No. 18090, three specimens; st. 38.

218. *Terebra* (*Strioterebrum*) *torquata* ADAMS and REEVE

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1) YOKOYAMA, M.: Jour. Fac. Sci., Imp. Univ., Tokyo, sec. 2, vol. 2, pt. 4, p. 172, pl. 47, fig. 2, 1927 (Pliocene fossil).

Reg. No. 18028, one specimen; st. 3.

219. *Terebra* (*Hastula*) *diversa* SMITH

Reg. No. 18042, two specimens; st. 25. Reg. No. 18044, two specimens; st. 31.

Plate I.

Figs. 1a, 1b. *Colus* (*Aulcofusus*) *mitrellaformis* n. sp. from st. 63, ×2.
Figs. 2a, 2b. *Turris* (*Gemmula*) *pseudogranosa* n. sp. from st. 3, ×2.
Figs. 3a, 3b. *Lora suganumana* n. sp. from st. 45, ×2.
Figs. 4a, 4b *Turris* (*Gemmula*) *husamaru* n. sp. from st. 3, ×2. Anterior end of canal lost.
Figs. 5a, 5b. *Nuculana* (*Jupitaria*) *husamaru* n. sp. from st. 85, ×2.
Figs. 6a, 6b, 7a, 7b. *Crassatellites oblongatus* YOKOYAMA, from st. 45, ×2.
Figs. 8a, 8b. *Pholadomya pacifica* DALL, from st. 45, ×1.
Figs. 9a, 9b. *Lora kazusensis* n. sp. from st. 44, ×3.
Figs. 10a, 10b. *Tibatrochus husaensis* n. gen. and. n. sp. from st. 45, ×3.
Figs. 11a, 11b. *Dentalium* (*Antalis*) *tibanum* n. sp. from st. 15, ×1.
Figs. 12. *Turritella* (*Haustator*) *tibana* n. sp. from st. 45, ×2.
Figs. 13a, 13b. *Cuspidaria* (*s.s.*) *suganumai* n. sp. from st. 53, ×2. End of beak lost.
Figs. 14a, 14b. *Mangelia subgracilenta* n. sp. from st. 85, ×3.

SINOZAKI photo.